Revision of the Indian Ocean Dottyback Fish Genera *Chlidichthys* and *Pectinochromis* (Perciformes: Pseudochromidae: Pseudoplesiopinae)

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INTRODUCTION

The Pseudoplesiopinae is one of 4 subfamilies recognised in the Indo-Pacific fish family Pseudochromidae. They are distinguished from members of the other subfamilies (Anisochrominae, Congrogadinae and Pseudochrominae) in having a single tubed lateral-line scale, which is positioned just behind the gill opening. Of the 4 subfamilies, the Pseudoplesiopinae is the least known subfamily taxonomically, despite being well represented in museum collections. The present study is our second in a series of papers that aim to revise the Pseudoplesiopinae. In the first paper (Gill & Edwards, 1999), we provided an historical review of the systematics of the Pseudoplesiopinae, cladistically diagnosed the subfamily and its 5 included genera, and proposed a scheme of intergeneric relationships. The aim of the present paper is to revise 2 of the genera, *Chlidichthys* Smith and *Pectinochromis* Gill & Edwards. Our intention is to revise the remaining 3 genera (*Amsichthys* Gill & Edwards, *Lubbockichthys* Gill & Edwards, and *Pseudoplesiops* Bleeker) in future papers.

The genera revised in the present paper represent a convenient grouping among pseudoplesiopines. They are sister taxa, sharing 5 unequivocal synapomorphies: 3 epurals; infraorbital 2 reduced or absent; laterosensory-canal-bearing bones weakly developed; second preopercle pore absent; and 10 precaudal vertebrae (Gill & Edwards, 1999). They are also geographically distinct in being restricted to the western and central Indian Ocean (including the Red Sea); the remaining pseudoplesiopine genera occur only marginally in the central Indian Ocean, and are otherwise restricted to the eastern Indian and Pacific Oceans.

MATERIALS AND METHODS

Specimens examined are listed under Material Examined for each species; institutional codes follow Leviton et al. (1985). Lists of paratypes of new species are arranged alphabetically by institutional code, then by registration number. Material Examined lists for other species are arranged by locality, generally in north to south and west to east directions. Only specimens that contributed to the descriptions are listed. Additional specimens of the more common species were also examined (checked for diagnostic features), and contributed information on distribution and habitat; lists of these specimens are available from the authors.

All measurements from the snout tip were made to the median anterior edge of the upper lip. Length of specimens is given in millimetres standard length (SL), which was measured from the snout tip to the middle of the caudal peduncle at the vertical through the posterior edge of the dorsal hypural plate. Head length was measured from the snout tip to the posteriormost edge of the opercular membrane. Snout length was measured over the shortest distance from the snout tip to the orbital rim, without constricting the fleshy rim of the latter. Orbit diameter was measured as its fleshy horizontal length. Interorbital width was measured as the least fleshy width. Upper jaw length was measured from the snout tip to the posterior edge of the maxilla. Predorsal, preanal and prepelvic lengths were measured from the snout tip to the base of the first spine of the relevant fin. Body width was measured between the posttemporal pores (Fig. 1). Caudal peduncle length was measured from the base of the last anal-fin ray to the ventral edge of the caudal fin at the vertical through the posterior edge of the ventral hypural plate. Caudal peduncle depth was measured obliquely between the bases of the last dorsal- and last anal-fin rays. Measurements of fin rays excluded any filamentous membranes. Pectoral fin length was measured as the length of the longest middle ray. Caudal fin length was measured as the length of the lowermost ray on the dorsal hypural plate.

Frequency distributions for selected meristic characters are given in Tables 1-15. Counts of dorsal-, anal- and pelvic-fin spines (unsegmented rays) and segmented rays are presented, respectively, as Roman and Arabic numerals. If the last dorsal- or anal-fin ray was divided at its base it was counted as a single ray. Counts of branched, segmented rays in the dorsal and anal fins included unbranched rays behind the first branched ray. A value was not recorded if, due to tip damage, a branched or unbranched condition could not be determined for the segmented ray preceding the anteriormost branched ray. As in most actinopterygian fishes, the upper ray in the pectoral fin is rudimentary and rotated so that its asymmetrical medial and lateral hemitrichs appear to represent 2 separate rays; these were counted as a single ray. Procurrent caudal-fin ray counts were of the rays above ("upper") and below ("lower") the principal caudal-fin rays. The uppermost principal caudal-fin ray was defined as the ray articulating with hypural 5, and the lowermost principal caudal-fin ray was the ray articulating with the cartilage nubbin between the distal tips of the parhypural and the haemal spine of preural centrum 2 (= post-haemal spine cartilage of PU2 following the terminology of Fujita, 1989). All species of *Chlidichthys* and *Pectinochromis* normally have 17 (9 + 8) principal caudal-fin rays.

Counts of "lateral scale series" were of the posteroventrally oriented transverse scale rows on the midside, beginning with the row through the tubed scale at the gill opening and ending with the row through the scale at the midposterior edge of the hypural plate.

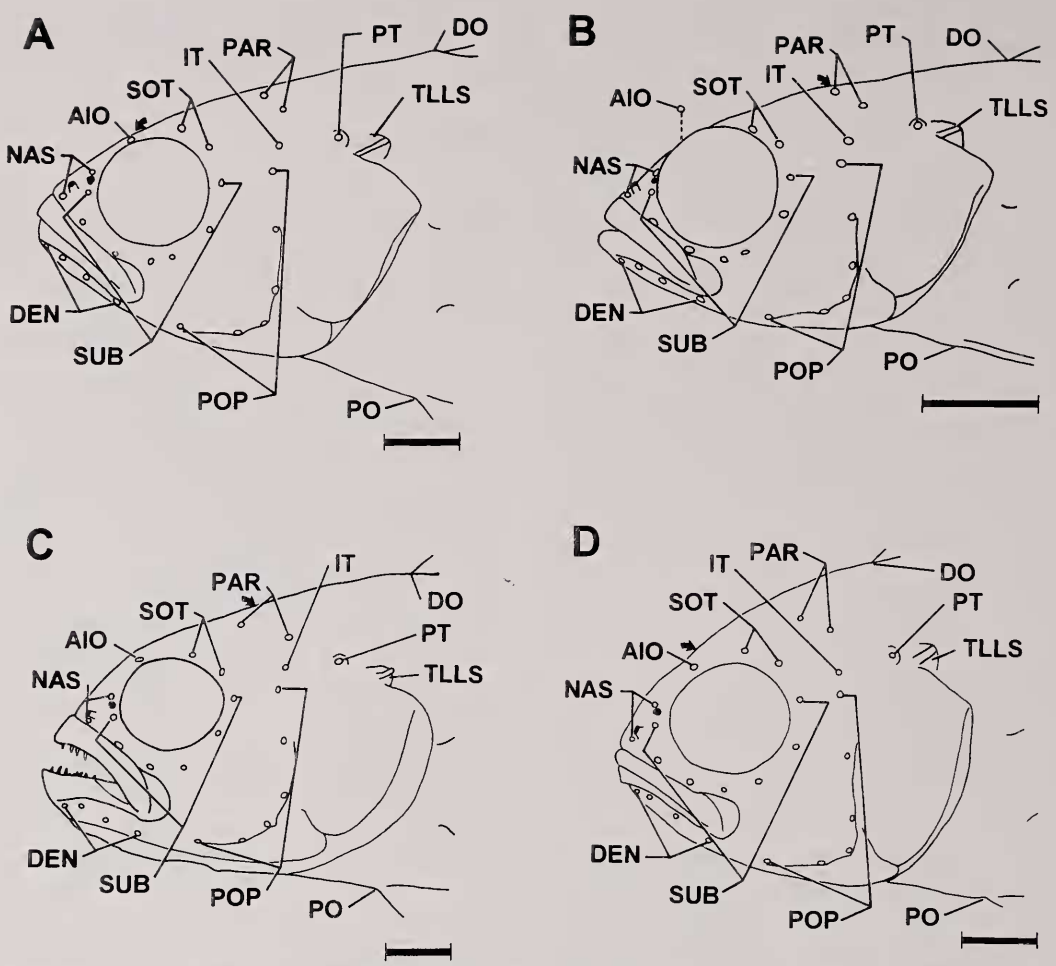

Figure 1. Left lateral diagrams of heads of: A) *Chlidichthys johnvoelckeri*, ROM 1736CS, 36.2 mm SL (redrawn from Gill & Edwards, 1999: fig. 12D); B) *C. chagosensis*, ROM 72506, 20.9 mm SL (holotype); C) *C. cacatuoides*, BPBM 36048, 37.6 mm SL (holotype; redrawn from Gill & Randall, 1994: fig. 3); and D) *Pectinochromis lubbocki*, BMNH 1982.6.9.1-4, 31.9 mm SL (paratype; redrawn from Gill & Edwards, 1999: fig. 12E). Arrows indicate anterior extent of predorsal scales. Nostrils shown in black. Abbreviations: AIO - anterior interorbital pore; DEN - dentary pores; DO - dorsal-fin origin; IT - intertemporal pore; NAS - nasal pores; PAR - parietal pores; PO - pelvic-fin origin; POP - preopercle pores; PT - posttemporal pore; SUB - suborbital pores; SOT - supraotic pores; TLLS - tubed lateral-line scale. Scale bars = 2 mm.

"Transverse scale series" were counted anterodorsally from the anal-fin origin to the dorsal-fin base. Circumpeduncle scales were counted in a zig-zag fashion around the middle of the caudal peduncle. Gill-raker counts were of the outer rakers on the first arch, including rudiments; the angle raker is included in the lower-limb (second) count. Counts of pseudobranch filaments included all rudiments. Nomenclature of head pores follows Winterbottom (1986), as modified by Gill et al. (2000).

Counts of vertebrae are presented in the form precaudal + caudal = total. Caudal vertebrae are defined as those with a haemal spine, and include the terminal urostylar complex (which was counted as a single vertebra). The pattern of insertion of supraneural (predorsal) bones and anterior dorsal-fin pterygiophores within interneural spaces is given as an "anterior dorsal-fin pterygiophore formula" modified from the "predorsal formula" of Ahlstrom et al. (1976). Each supraneural is represented by an "S," neural spines are represented by slashes, and pterygiophores are represented by "3" (indicating a pterygiophore that bears 2 supernumerary rays and a serially associated ray), or "1" (indicating a pterygiophore that bears only a serially associated ray). Parentheses enclose elements that may be absent. An "anterior anal-fin pterygiophore formula" is also presented, and is similar to the anterior dorsal-fin pterygiophore formula, except that the slashes represent haemal spines, and "2" indicates a pterygiophore that supports a supernumerary ray and a serial ray. Osteological features were determined from x-radiographs and from cleared-and-stained specimens, which were variously prepared following the methods of Taylor (1967), Dingerkus & Uhler (1977), Potthoff (1984) and Taylor & Van Dyke (1985).

Meristic and morphometric data ranges are given first for all specimens, followed, where variation was noted, by data for the holotype in parentheses ("?" indicates where a value was not obtainable from the holotype); where bilateral counts were recorded from the holotype, both counts are given and separated from each other by a slash, the first count being the left count.

Chlidichthys Smith

Chlidichthys Smith, 1953: 518 (type species: *Chlidichthys johnvoelckeri* Smith, 1953, by monotypy).

Wamizichthys Smith, 1954: 205 (type species: *Wamizichthys bibulus* Smith, 1954, by original designation and monotypy).

DIAGNOSIS: *Chlidichthys* is distinguished from other pseudoplesiopines and demonstrably monophyletic in having the following specialisations: lower lip incomplete (interrupted at symphysis), not forming a free fold; and 4 rather than 5 infraorbital bones (including the "lachrymal" and dermosphenotic), resulting from absence of the second infraorbital bone (Figs 2A-C). Other characters useful in identifying the genus are: dorsal-fin rays II,21-24, last 1-9 rays branched; anal-fin rays II-III,12-15, last 1-7 rays branched; total caudal-fin rays 25-29; pelvic-fin rays I,4, all rays unbranched; lateral scale series 35-52; pelvic bones not deeply cupped; vertebrae 10 + 17-19; epurals 3; anterior dorsal-fin pterygiophore insertion pattern usually S/S/3/1 + 1; extrascapular bones tubular, without plate-like laminar projections; suborbital pores 6-8, rarely 8; and preopercle pores 5-7, rarely 5 or 7.

REMARKS: The above autapomorphies of *Chlidichthys* are illustrated and discussed in greater detail by Gill & Edwards (1999). Previous concepts of the genus have included species we consider to belong to other pseudoplesiopine genera (see Gill & Edwards, 1999: 143). For example, Smith (1954) included *Pseudoplesiops rosae* Schultz in *Chlidichthys*, but it is correctly placed in *Pseudoplesiops*. Allen & Steene (1979) listed 3 undescribed species of *Chilidichthys* [sic] from Christmas Id, eastern Indian Ocean, but these are referable to other genera: *C.* sp. 1 is a species of *Pseudoplesiops* (recently described as *P. immaculatus* Gill & Edwards, 2002); *C.* sp. 2 and *C.* sp. 3 are species of *Lubbockichthys*. Wass (1984) identified a pseudoplesiopine from Samoa as *Chlidichthys* sp., but it is also a species of *Lubbockichthys*.

Conversely, Edwards & Randall (1983) placed *Chlidichthys* (and *Wamizichthys*) in synonymy with *Pseudoplesiops*. Such synonymy would be cladistically defensible only if *Amsichthys* and *Pectinochromis* were also placed in synonymy with *Pseudoplesiops*. However, this would reduce the phylogenetic information content of the generic classification.

ETYMOLOGY: Smith (1953, 1954) did not provide an etymology for the genus. *Chlidichthys* is probably from the Greek *chlidanos*, meaning delicate, luxurious or voluptuous, or *chlidon*, meaning ornament, and *ichthys*,

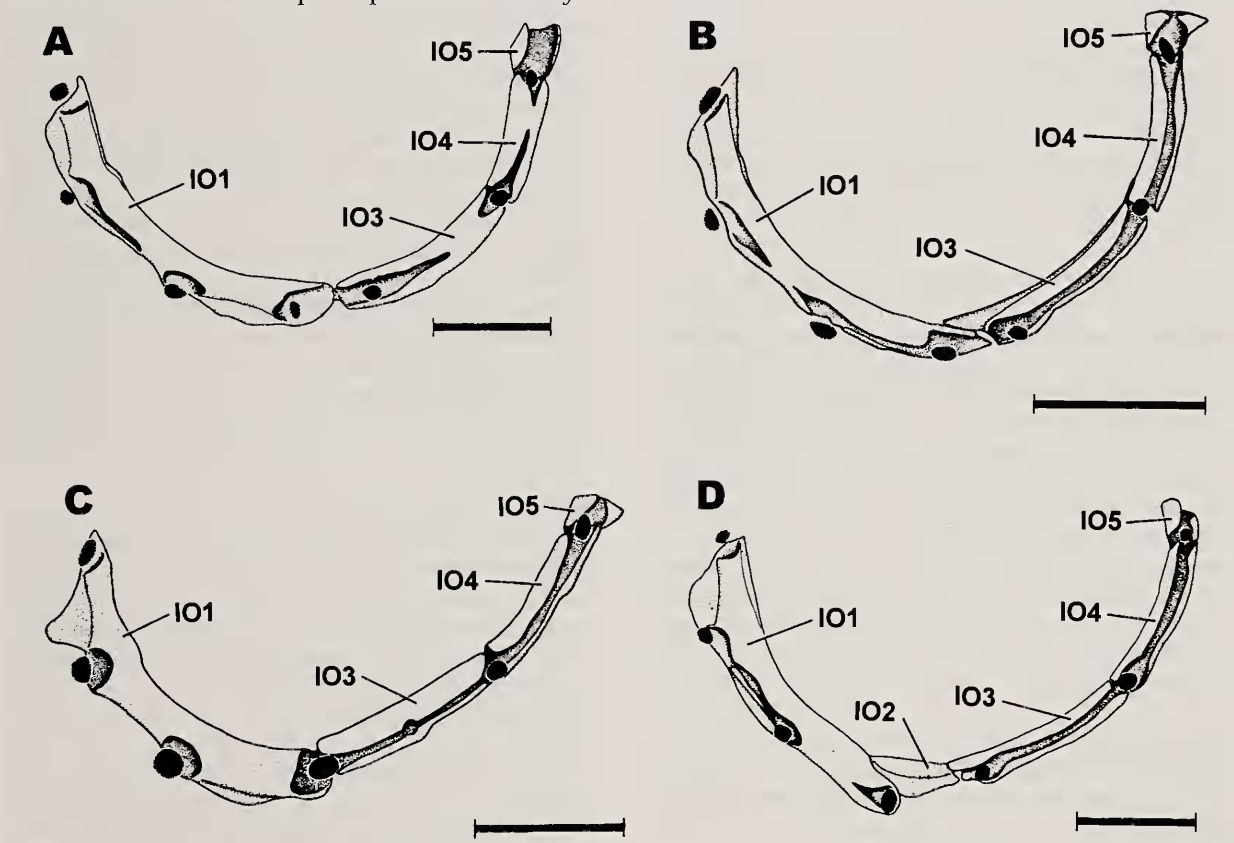

Figure 2. Infraorbital bones (IO1-5) of selected pseudoplesiopine species: A) *Chlidichthys johnvoelckeri*, CAS 35451, 37.9 mm SL (redrawn from Gill & Edwards, 1999: fig. 10D); B) *C. chagosensis*, AMS I.23653-003, 27.9 mm SL (paratype); C) *C. cacatuoides*, BMNH 1994.4.19.1, 37.2 mm SL (paratype); and D) *Pectinochromis lubbocki*, BPBM 28119, 35.5 mm SL (paratype; redrawn from Gill & Edwards, 1999: fig. 10E). Suborbital pores are indicated in mechanical stipple. Scale bars = 1 mm.

meaning fish. Gender is masculine.

Key to Species of *Chlidichthys*

1a. Predorsal scales extend anteriorly only to supratemporal commissure (Figs 1B-C) 2
1b. Predorsal scales extend anteriorly beyond supratemporal commissure (Fig. 1A) 5

2a. Suborbital pores 6-8, usually 7 (Fig. 1B); sensory canal of infraorbital 1 usually not continuous with adjacent infraorbital (infraorbital 3), and usually with a pore at terminus of each bone (Fig. 2B) .....*C. chagosensis* new species (Chagos Archipelago)
2b. Suborbital pores 6-7, usually 6 (Fig. 1C); sensory canal of infraorbital 1 continuous with adjacent infraorbital (infraorbital 3), with a single pore at junction of these 2 bones (Fig. 2C) 3

3a. Ctenoid scales beginning at 17-20 transverse scale rows behind gill opening; gill-rakers 3 + 9-10; first segmented dorsal-fin ray 16.2-39.0 % SL .*C. cacatuoides* (Socotra and southern Oman)
3b. Ctenoid scales beginning at 8-17, rarely 15 or more, transverse scale rows behind gill opening; gill-rakers 3-6 + 10-13 = 13-19, usually 3-4 + 11-12 = 14-17; first segmented dorsal-fin ray 8.6-21.3 % SL 4

4a. Segmented dorsal-fin rays 21-22, usually 22; segmented anal-fin rays 13-14, usually 13; vertebrae 10 + 16-17, usually 10 + 17 ..... *C. inornatus* (Maldive Ids and Sri Lanka)
4b. Segmented dorsal-fin rays 22-24, usually 23; segmented anal-fin rays 13-15, usually 14; vertebrae 10 + 18 ..... *C. rubiceps* (Red Sea)

5a. Lateral scale series 47-52, usually 48-51; lower procurrent caudal-fin rays 5-6, usually 6; circumpeduncle scales 22-25, usually 23-24; head and body pale yellow to pale brown (cerise pink to magenta in life), with scales behind pectoral base each with brown to greyish brown basal spot (purple to dark grey in life), forming weak reticulated pattern; dorsal and anal fins dusky grey to dark grey (in life, dark grey with greenish iridescence basally, followed distally by bright red or magenta, then pinkish hyaline, then bluish grey with pale pink distal margin) ..... *C. johnvoelckeri* (Comoro Ids and Tanzania to Mozambique, east Africa)
5b. Lateral scale series 37-49; lower procurrent caudal-fin rays 4-5; circumpeduncle scales 18-23; coloration not as above 6

6a. Segmented dorsal-fin rays 22-24, usually 23; segmented anal-fin rays 13-15, usually 14 7
6b. Segmented dorsal-fin rays 21-23, usually 22; segmented anal-fin rays 12-14, usually 13 9

7a. Circumpeduncle scales 20-23; head and body pale yellow to pale brown (in life pinkish white to blue or olive-green, pink on head and chest in small juveniles, with snout, chin, lips, interorbital and occiput abruptly dusky orange to bright reddish orange), with 3 dark brown to dark greyish brown stripes (dusky orange to dark grey or black in life), one from upper rear part of orbit beneath dorsal-fin base to dorsal edge of caudal fin, one from upper part of operculum, above pectoral fin base along midside to middle of caudal-fin base, and one from pectoral-fin base along anal-fin base to lower part of caudal fin; dorsal and anal fins dark brown to dark greyish brown basally (dusky grey to black in life), pale brown to hyaline on remainder of fin (in life greenish to pinkish hyaline, with distal edge and fin rays pink to mauve or magenta) ..... *C. bibulus* (east coast of Africa, Aldabra and Socotra)
7b. Circumpeduncle scales usually 20; coloration not as above 8

8a. Pectoral-fin rays 15-17, usually 16; ctenoid scales beginning at 6-15 transverse scale rows behind gill opening; transverse scale series 16-19, usually 17-18; head and body generally brown (golden yellow to orange in life), with 4 or 5 pale yellow to pale brown (bright orange to bright red in life) stripes on head and front part of body; dorsal and anal fins greyish brown to pale brown (reddish to orangish hyaline in life); and caudal fin greyish brown basally (bright orange to bright red in life), with remainder of fin pale brown to hyaline (orangish hyaline in life)..... *C. auratus* (Red Sea)
8b. Pectoral-fin rays 16-18, usually 17-18; ctenoid scales beginning at 1-3 transverse scale rows behind gill opening; transverse scale series 18-21; head and body pale brown to brown (in life, pale green to olive or bright green, with yellow to bright orange or bright red stripes on head and front of body, and snout and anteroventral part of head reddish grey to bright red), with bases of scales edged with dark brown (dark olive-grey in life), giving reticulate pattern; dorsal and anal fins dark brown to dark grey basally (bluish grey to olive in life), greyish to brownish hyaline distally; scaly sheath of caudal fin similar to body coloration, edged posteriorly with dark brown to grey (olive-grey in life), remainder of fin greyish to brownish hyaline..... *C. clibanarius* new species (Madagascar, Comoro Ids and Aldabra)

9a. Ctenoid scales beginning at 2-6 transverse scale rows behind gill opening; pectoral-fin rays 17-19, usually 18; lateral scale series 42-50; gill-rakers 4-6 + 11-14 = 16-19, total rakers usually 16-18 10
9b. Ctenoid scales beginning at 7-14 transverse scale rows behind gill opening; pectoral-fin rays 15-18, usually 17; lateral scale series 37-45; gill-rakers 3-4 + 9-12 = 12-15, total rakers usually 13-14 12

10a. Caudal fin 21.0-23.8 % SL; total gill rakers 16-18, usually 16 ..... *C. foudioides* (Rodrigues)
10b. Caudal fin 18.5-21.4 % SL; total gill rakers 16-19, usually 17-18 11

11a. Orbital rim whitish grey (pale mauve in life) .....
..... *C. randalli* (Mauritius)

11b. Orbital rim brown (orange to olive in life) .... *C. abruptus* (St Brandon's Shoals)
12a. Lateral scale series 37-42, usually 38-41; anal-fin spines usually 2 ..... *C. pembae* (Comoro Ids and Tanzania to Natal, east Africa)
12b. Lateral scale series 40-45, usually 41-43; anal-fin spines usually 3 ..... *C. smithae* (Mauritius)

Chlidichthys abruptus Lubbock
St Brandon's Dottyback
Fig. 3; Pl. 1A

Chlidichthys abruptus Lubbock, 1977: 17, pls 5c-d (type locality, Raphael Id, Cargados Carajos; holotype, RUSI 1903); Gill & Randall, 1994: 12 (generic classification); Gill & Edwards, 1999: 146 (list).

DIAGNOSIS: A species of *Chlidichthys* with the following combination of characters: dorsal-fin rays II,21-22, usually II,22; anal-fin rays usually II-III,12-13, usually III,13; predorsal scales extending to point ranging from vertical above anterior supraotic to just short of anterior interorbital pores; lateral scale series 42-48; ctenoid scales beginning at 2-6 transverse scale rows behind gill opening; orbital rim brown (orange to olive in life); and caudal fin 18.5-21.4 % SL.

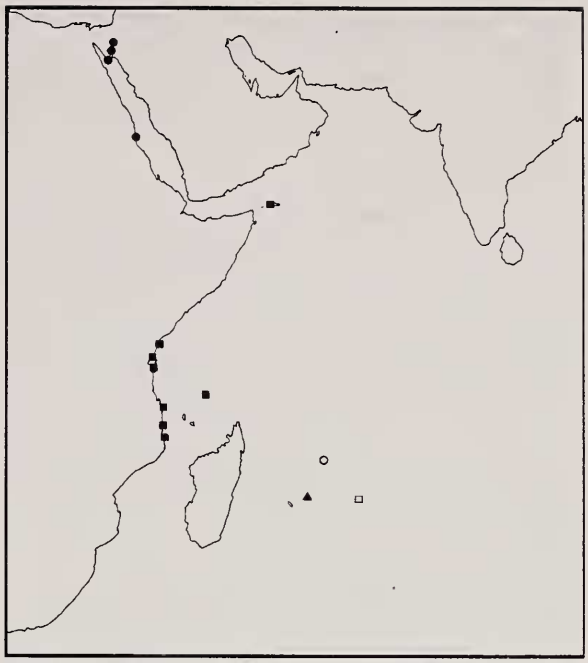

Figure 3. Distributional records for *Chlidicthys abruptus* (open circle), *C. bibulus* (squares), *C. foudioides* (open square), *C. randalli* (triangle) and *Pectinochromis lubbocki* (closed circles).

DESCRIPTION (based on 24 specimens, 22.0-46.5 mm SL): Dorsal-fin rays II,21-22 (II,22), last 5-7 (7) rays branched; anal-fin rays II-III,12-13 (III,13), last 3-6 (6) rays branched; pectoral-fin rays 17-19 (18/18), upper 2-4 (3/3) and lower 2-4 (3/3) rays unbranched; pelvic-fin rays I,4, all rays unbranched; principal caudal-fin rays 9 + 8, the uppermost 1-2 (1) and lowermost 1-2 (2) rays unbranched; upper procurrent caudal-fin rays 5-6 (5); lower procurrent caudal-fin rays 4-5 (5); total caudal-fin rays 26-28 (27); lateral scale series 42-48 (48/45); predorsal scales 11-16 (16); transverse scale series 17-20 (18/18); scales behind eye 2; scales to preopercle angle 3-5 (3); circumpeduncle scales 19-20 (20); ctenoid scales beginning at 2-6 (5/3) transverse scale rows behind gill opening; gill-rakers 4-6 + 11-14 = 16-19 (5 + 12); pseudobranch filaments 7-10 (8).

Head pores (all bilaterally paired except posterior interorbital pores): nasal pores 2-3 (2/2); anterior interorbital pores 1; posterior interorbital pores 0-1 (0); supraotic pores 2; suborbital pores 7; posterior otic pores 0; preopercle pores 5-7 (6/6); dentary pores 4-5 (4/4); intertemporal pores 1; anterior temporal pores 0-1 (0/0); posttemporal pores 1; parietal pores 2.

As percentage of standard length (based on 24 specimens, 22.0-46.5 mm SL): body depth at dorsal-fin origin 21.8-25.2 (24.2); greatest body depth 22.8-27.1 (26.1); body width 11.0-12.4 (11.3); head length 27.5-31.4 (27.5); snout 5.2-6.4 (5.6); orbit diameter 8.5-11.4 (9.6); interorbital width 3.0-3.7 (3.1); upper jaw 10.0-11.4 (10.1); caudal peduncle depth 12.7-14.6 (14.6); caudal peduncle length 11.1-12.7 (12.0); predorsal 31.2-35.5 (32.9); preanal 56.3-62.7 (61.4); prepelvic 27.1-30.9 (29.4); first segmented dorsal-fin ray 7.3-15.6 (10.4); third from last segmented dorsal-fin ray 11.5-15.6 (13.6); dorsal-fin base 55.5-62.7 (56.5); first segmented anal-fin ray 8.6-10.3 (9.6); third from last segmented anal-fin ray 12.4-15.0 (12.7); anal-fin base 25.9-30.3 (28.0); caudal fin 18.5-21.4 (20.0); pectoral fin 14.1-19.2 (18.4); pelvic fin 14.5-22.3 (19.5).

Lower lip incomplete; sensory canal of infraorbital 1 not continuous with sensory canal of infraorbital 3; fin spines weak and flexible; anterior dorsal-fin pterygiophore formula S/S/3/1 + 1 or S/S/S + 3/1 + 1 (S/S/3/1 + 1); 15-16 (15) consecutive dorsal-fin pterygiophores inserting in 1:1 relationship directly behind neural spine 4; anterior anal-fin pterygiophore formula 3/1 + 1, 2/1 + 1 or 2/1 (3/1 + 1); 6-7 (6) consecutive anal-fin pterygiophores inserting in 1:1 relationship directly behind haemal spine 2; second segmented pelvic-fin ray longest; caudal fin weakly rounded to truncate or slightly emarginate; dorsal and anal fins without scaly sheath, although some fish with a few scales overlapping fin bases; anterior lateral line represented by a single tubed scale at gill opening, followed by intermittent series of centrally pitted scales, which terminate beneath segmented dorsal-fin ray 17-22 or slightly past termination of dorsal fin (slightly past dorsal-fin termination/beneath segmented dorsal-fin ray 22 in holotype); second intermittent series of centrally pitted scales originating on midside above anterior part of anal fin, extending along midside to middle of caudal-fin base; additional 1-3 centrally pitted scales present above and below pitted scale(s) on middle part of caudal-fin base; scales present on cheeks (extending posteriorly over dorsal part of preopercle) and operculum; predorsal scales extending to interorbital commissure (at point ranging from vertical above anterior supraotic to just

short of anterior interorbital pores); vertebrae 10 + 17 (apparently 10 + 16 in one specimen with badly damaged and regrown caudal skeleton) (10 + 17); epurals 3; epineurals present on vertebrae 1 through 13-16 (13); ribs present on vertebrae 3 through 10, the final rib relatively long.

Upper jaw with 2-5 pairs of curved, enlarged caniniform teeth anteriorly, the medial pair smallest, and 5-6 (at symphysis) to 1-3 (on sides of jaw) irregular inner rows of small conical teeth, the teeth on outer row of conical teeth largest; lower jaw with 2-4 pairs of curved, enlarged caniniform teeth, the medial pair smallest, and 3-5 (at symphysis) to 1 (on sides of jaw) irregular inner rows of small conical teeth, the conical teeth gradually increasing in size and becoming more curved and caniniform on middle part of jaw, then becoming abruptly smaller on rear part of jaw; vomer with 1-2 rows of small conical teeth arranged in a chevron; palatines with 1-2 irregular rows of small conical teeth in an elongate patch; tongue pointed, without teeth.

Live coloration (based on colour photographs of 2 specimens from St Brandon's Shoals; Pl. 1A): head and body olive-green to olive-brown, paler ventrally; snout and most of head below eye abruptly bright orange; orbital rim orange to olive; iris light orange, becoming brown towards outer margin, with blue suboval ring around pupil; body with indistinct brown bars following myomere positions; dorsal fin olive-brown basally, becoming pinkish to brownish hyaline distally; anal and caudal fins olive, darker basally; pectoral and pelvic fins hyaline.

Preserved coloration: head and body brown, paler ventrally and on snout and anterior part of head; dark brown barring following myomeres, this most conspicuous on anterior part of body; dorsal fin dark grey-brown basally, pale brown distally; anal and caudal fins brown, becoming pale brown to hyaline distally; pectoral and pelvic fins hyaline to pale brown.

HABITAT AND DISTRIBUTION: *Chlidichthys abruptus* is known only from St Brandon's Shoals (= Cargados Carajos), northeast of Mauritius (Fig. 3). It has been collected from drop-offs, surge channels and coral and rock reefs in 0-21 m.

COMPARISONS: *Chlidichthys abruptus* closely resembles *C. randalli* from Mauritius and *C. foudioides* from Rodrigues in most meristic and morphometric details. The 3 species are differentiated from all other congeners by the following character combination: dorsal-fin rays usually II,22; anal-fin rays usually III,13; predorsal scales extending to point ranging from vertical above anterior supraotic to just short of anterior interorbital pores; lateral scale series 42-50; and ctenoid scales beginning at 2-6 transverse scale rows behind gill opening. They are unique among species of *Chlidichthys* in usually having 18 pectoral-fin rays; other species usually have 16 or 17. As *C. randalli* is known only from 2 specimens, comparisons between the 3 species are difficult.

Chlidichthys foudioides is relatively distinct among the 3 species in having a longer caudal fin (21.0-23.8 % SL versus 18.5-21.4 % SL in *C. abruptus* and 20.0 % SL in *C. randalli*), and fewer total gill rakers (16-18, modally 16 versus 16-19, modally 18 in *C. abruptus* and 17 in *C. randalli*). It further differs from *C. randalli* in having a longer head (29.6-32.6 % SL versus 29.3-29.4 % SL) and a longer caudal peduncle (11.9-13.6 % SL versus 11.1-11.2 % SL), and from *C. abruptus* in having more predorsal scales (12-17, modally 15 versus 11-16, modally 13).

Differentiation of *C. abruptus* from *C. randalli* is difficult due to the small sample size of the latter (as noted above). Lubbock (1977) distinguished the 2 species on the basis of: number of predorsal scales (16-22 in *C. abruptus* versus 12-14 in *C. randalli*); number of scale rows on preopercle (4 versus 3); anal-fin base length (26.9-28.8 versus 26.2-26.3 % SL); and snout coloration (abruptly orange in life versus "pinkish bluish grey"). However, Lubbock's comparisons for *C. abruptus* were based on only the 6 type specimens. We have been unable to repeat Lubbock's predorsal scale counts for *C. abruptus*; our counts for the types and for 17 additional specimens were 11-16, thus encompassing the counts for *C. randalli*; however, the counts for the latter were one higher than the modal count for *C. abruptus* (Table 4). We also failed to detect differences in numbers of cheek scale rows (Table 5) or in anal-fin base length (25.9-30.3 % SL in *C. abruptus* and 27.8-28.6 % SL in *C. randalli*). Thus, of the characters advanced by Lubbock, only the live coloration of the snout appears to be distinctive. However, this character is also problematic as our understanding of live coloration of these 2 species is based on colour photographs of 2 specimens of *C. abruptus* and a single specimen of *C. randalli*, and coloration may prove more variable. Moreover, snout coloration varies considerably among other pseudoplesiopine species, and in several species coloration ranges from grey to orange or red; indeed, snout coloration varies from greyish red to bright orange in the closely related *C. foudioides*.

Other coloration details that were not considered by Lubbock (1977) provide more compelling justification for recognition of the species. In *C. randalli* the orbital rim is whitish grey (pale mauve in life) with a short stripe of similar coloration from behind the mid-rear edge of eye to just above the lateral-line scale, and another pale stripe extending around ventral and rear edges of preopercle to the upper part of operculum; the area between the stripes is bright orange-red in life. With the exception of the pale orbital rim, these markings are now indistinct in the 2 specimens of *C. randalli*; however, we have not noted similar coloration in any specimens of *C. abruptus*. In these coloration details, however, *C. randalli* is fairly similar to *C. foudioides*.

The 3 species may differ in mean numbers of supraneural bones (although more specimens of *C. randalli* are needed to confirm this): *C. abruptus* has 2-3, usually 3, supraneurals, *C, foudioides* has 2-3, usually 2, supraneurals, and the 2 type specimens of *C. randalli* have only 2 supraneurals (Table 10).

REMARKS: *Chlidichthys abruptus* is a relatively large

species; the largest specimen examined is 46.5 mm SL. A colour photograph is given by Lubbock (1977). It is one of 3 pseudochromid species endemic to St Brandon's Shoals. The others are the anisochromine *Anisochromis straussi* Springer, Smith & Fraser (Gill & Fricke, 2001) and the pseudochromine *Pseudochromis magnificus* Lubbock (Gill, 2004).

ETYMOLOGY: The specific epithet is from the Latin, and alludes to the abruptly demarcated orange snout.

MATERIAL EXAMINED: ST BRANDON'S SHOALS (CARGADOS CARAJOS): USNM 257759, 1: 34.5 mm SL, off N tip of St Brandon's Shoals, 16°25'S 059°36'E, 6-10.5 m, V.G. Springer et al., 6 April 1976; RUSI 1903, 1: 42.5 mm SL (holotype), SW side of Raphael Id, surge channel in patch reef, T.H. Fraser, 23 March 1971; BMNH 1976.7.13.6-7 (incorrectly given as BMNH 1976.7.14.1-2 in Lubbock, 1977), 2: 41.6-42.6 mm SL (paratypes), USNM 216139, 3: 39.0-46.5 mm SL (paratypes), USNM 216254, 9: 35.9-44.5 mm SL, USNM 217379, 1: 22.0 mm SL, 0.5 miles S of Raphael Id, 0-9 m, V.G. Springer et al., 12 April 1976; USNM 257760, 7: 43.6-45.9 mm SL, ca. 100 m off W side of Raphael Id (ca. 16°26'S 059°36'E), surge channel, fossil coral rock patch, 0-7.5 m, V.G. Springer et al., 2 April 1976.

***Chlidichthys auratus* Lubbock**
Golden Dottyback
Fig. 4; Pls 1B-C

Chlidichthys auratus Lubbock, 1975: 152, pl. 3b (type locality, Port Sudan; holotype, BMNH 1973.12.20.172); Dor, 1984: 105 (Red Sea); Goren & Dor, 1994: 28 (Red Sea); Gill & Randall, 1994: 12 (generic classification); Gill & Edwards, 1999: 146 (list).

Pseudoplesiops auratus: Edwards & Randall, 1983: fig. 2 (Jeddah, Red Sea); Randall, 1983: 60 (description; col. fig.).

DIAGNOSIS: A species of *Chlidichthys* with the following combination of characters: dorsal-fin rays II,22-23, usually II,23; anal-fin rays III,13-15, usually III,14; pectoral-fin rays 15-17, usually 16; predorsal scales 12-15, extending to interorbital commissure (at point ranging from vertical through anterior interorbital pores to midway between anterior interorbital and anteriormost supraotic pores); and ctenoid scales beginning at 6-15 transverse scale rows behind gill opening. It also has distinctive live and preserved coloration: head and body generally brown (golden yellow to orange in life), with 4 or 5 pale yellow to pale brown (bright orange to bright red in life) stripes on head and anterior part of body; dorsal and anal fins greyish brown to pale brown (reddish to orangish hyaline in life); and caudal fin greyish brown basally (bright orange to bright red in life), with remainder of fin pale brown to hyaline (orangish hyaline in life).

DESCRIPTION (based on 31 specimens, 25.5-39.0 mm SL): Dorsal-fin rays II,22-23 (II,23), last 3-7 (5) rays branched; anal-fin rays III,13-15 (III,14), last 4-6 (4) rays branched; pectoral-fin rays 15-17 (16/16), upper 2-5 (3/4) and lower 2-4 (2/2) rays unbranched; pelvic-fin rays I,4, all rays unbranched; principal caudal-fin rays 9 + 8, the uppermost 1-2 (?) and lowermost 2 (?) rays unbranched; upper procurrent caudal-fin rays 4-6 (5); lower procurrent caudal-fin rays 4-5 (5); total caudal-fin rays 25-28 (27); lateral scale series 40-47 (45/47); predorsal scales 12-15 (12); transverse scale series 16-19 (18/18); scales behind eye 1-3 (2); scales to preopercle angle 3-4 (3); circumpeduncle scales 20-21 (20); ctenoid scales beginning at 6-15 (10/12) transverse scale rows behind gill opening; gill-rakers 4-6 + 11-14 = 15-20 (4 + 14); pseudobranch filaments 6-9 (8).

Head pores (all bilaterally paired except posterior interorbital pores): nasal pores 2-3 (2/2); anterior interorbital pores 1; posterior interorbital pores 0; supraotic pores 1-2 (2/2); suborbital pores 7-8 (7/7); posterior otic pores 0-1 (0/0); preopercle pores 6-7 (6/6); dentary pores 4; intertemporal pores 1; anterior temporal pores 0-1 (0/0); posttemporal pores 1; parietal pores 2-3 (2/2).

As percentage of standard length (based on 26 specimens, 25.5-35.3 mm SL): body depth at dorsal-fin origin 20.7-24.4 (22.0); greatest body depth 21.3-27.1 (23.3); body width 10.1-12.1 (12.1); head length 27.6-30.5 (28.0); snout 4.3-5.9 (4.3); orbit diameter 9.0-10.9 (9.9); interorbital width 3.0-4.3 (3.4); upper jaw 8.8-10.2 (9.6); caudal peduncle depth 12.0-14.6 (13.4); caudal peduncle length 9.4-11.4 (11.2); predorsal 29.7-34.0 (30.4); preanal 55.6-60.5 (59.0); prepelvic 27.0-32.1 (27.6); first segmented dorsal-fin ray 7.7-10.7 (8.4); third from last segmented

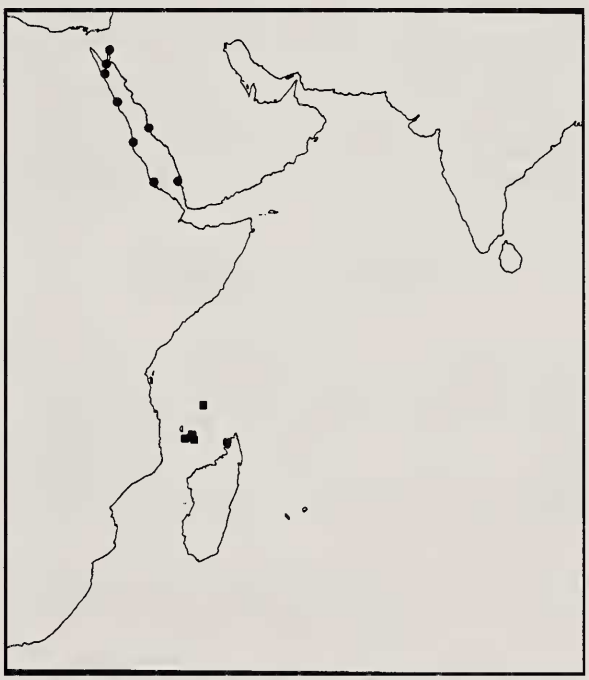

Figure 4. Distributional records for *Chlidichthys auratus* (closed circles) and *C. clibanarius* (closed squares).

dorsal-fin ray 11.9-15.2 (13.4); dorsal-fin base 58.2-66.4 (63.7); first segmented anal-fin ray 7.9-10.6 (9.3); third from last segmented anal-fin ray 11.0-14.5 (12.7); anal-fin base 28.1-34.9 (31.4); caudal fin 20.1-23.2 (20.2); pectoral fin 15.6-21.0 (16.5); pelvic fin 17.6-22.7 (21.1).

Lower lip incomplete; sensory canal of infraorbital 1 not continuous with sensory canal of infraorbital 3; fin spines weak and flexible; anterior dorsal-fin pterygiophore formula S/S/3/1 + 1 or S/S/S + 3/1 + 1 (S/S/3/1 + 1); 15 consecutive dorsal-fin pterygiophores inserting in 1:1 relationship directly behind neural spine 4; anterior anal-fin pterygiophore formula 3/1 + 1/1, 3 + 1/1/1, 3/1/1 + 1 or 3/1 + 1 + 1// (3/1 + 1 + 1//); 6-7 (6 plus 1 vacant interhaemal space in holotype; scored in Table 13 as 7) consecutive anal-fin pterygiophores inserting in 1:1 relationship directly behind haemal spine 2; second segmented pelvic-fin ray longest; caudal fin weakly rounded to rounded; dorsal and anal fins without distinct scaly sheath, although some fish with a few scales overlapping fin bases; anterior lateral line represented by single tubed scale at gill opening, followed by intermittent series of centrally pitted scales, which terminate beneath segmented dorsal-fin ray 16-23 (23/23); second intermittent series of centrally pitted scales originating on midside at point varying from mid-abdomen to vertical above anterior part of anal fin, extending on to middle part of caudal-fin base; additional 1-3 centrally pitted scales present above and below pitted scale(s) on middle part of caudal-fin base; scales present on cheeks (extending posteriorly over dorsal part of preopercle) and operculum; predorsal scales extending to interorbital commissure (at point ranging from vertical through anterior interorbital pores to midway between anterior interorbital and anteriormost supraotic pores); vertebrae 10 + 17; epurals 3; epineurals present on vertebrae 1 through 14-16 (1 through 15); ribs present on vertebrae 3 through 10, the final rib relatively long.

Upper jaw with 3-5 pairs of curved, enlarged caniniform teeth anteriorly, the medial pair usually smallest, and 5-7 (at symphysis) to 1-2 (on sides of jaw) irregular inner rows of small conical teeth, the teeth on outer row of conical teeth largest; lower jaw with 2-4 pairs of curved, enlarged caniniform teeth, the medial pair usually smallest, and 3-5 (at symphysis) to 1 (on sides of jaw) irregular inner rows of small conical teeth, the conical teeth gradually increasing in size and becoming more curved and caniniform on middle part of jaw, then becoming abruptly smaller on rear part of jaw; vomer with 1 row of small conical teeth arranged in a chevron; palatines with at most 1-2 irregular rows of small conical teeth in elongate patch, often with just 1-2 isolated teeth at anterior part of bone; tongue pointed, without teeth.

Live coloration (based on Lubbock, 1975: 152, pl. IIIc, and on colour transparencies of fish in Egypt and Saudi Arabia; Pls 1B-C): head and body golden yellow to orange; bright orange to bright red median stripe from interorbital area to origin of dorsal fin; second bright orange stripe from upper rear part of orbital rim along dorsal part of body, ending beneath about 13th to 16th segmented dorsal-fin ray; third bright orange stripe extending in arc from beneath eye to posterodorsal part of opercle, this parallelled ventrally by shorter bright orange stripe from isthmus to subopercle; very short bright orange stripe or spot sometimes present along dorsal edge of opercle between second and third stripes; area adjacent to orange stripes and spot bluish orange to purplish or bluish grey; posterior rim of orbit bluish grey, sometimes edged anteriorly with short dark grey bar; snout bluish grey to bluish orange with bright orange stripe extending from anterior edge of orbit; iris yellow to bright orange; dorsal and anal fins reddish to orangish hyaline, with faint blue and orange stripes basally, sometimes with distal margin of fins bright blue; caudal fin bright orange to red basally, orangish hyaline posteriorly; pectoral fins hyaline to pinkish hyaline; pelvic fins hyaline to pinkish hyaline, sometimes with anterior edge of fins edged in pale to bright blue.

Preserved coloration: pattern generally similar to live coloration, head and body becoming brown, paler ventrally; bright orange to bright red stripes on head and body remain, becoming pale yellow to pale brown; bluish markings on head and body become greyish brown; dorsal and anal fins brown to pale brown; bright orange to red basal mark on caudal fin becoming greyish brown, usually darkest on rear edge of mark; remainder of caudal fin pale brown to hyaline; pectoral and pelvic fins pale brown to hyaline.

HABITAT AND DISTRIBUTION: *Chlidichthys auratus* is found throughout the Red Sea, from the Gulf of Aqaba south to the Karaman Archipelago (Fig. 4). It has been collected from reefs at depths ranging from 2-30 m.

COMPARISONS: *Chlidichthys auratus* resembles *C. bibulus* (from Socotra, east Africa and Aldabra), *C. clibanarius* (from the Comoro Ids, northern Madagascar and Aldabra), and *C. johnvoelckeri* (from east Africa and the Comoro Ids) in general meristic and morphometric values. The 4 species differ in various meristic characters, particularly the following: number of segmented dorsal-fin rays (usually 22 in *C. johnvoelckeri* versus usually 23 in the other species; Table 1); number of segmented anal-fin rays (13 in *C. johnvoelckeri* versus usually 14 in the other species; Table 1); number of pectoral-fin rays (15-17, modally 16 in *C. auratus* versus 16-18, modally 17 in the other species; Table 1); number of caudal-fin rays (upper procurrent rays usually 6 in *C. johnvoelckeri* versus usually 5 in the other species; lower procurrent rays usually 6 in *C. johnvoelckeri* versus usually 5 in the other species; total caudal-fin rays 28-30 in *C. johnvoelckeri* versus usually 27 in the other species; Table 2); lateral scale series counts (40-47 in *C. auratus*, 45-48 in *C. bibulus*, 43-49 in *C. clibanarius* and 47-52 in *C. johnvoelckeri*; Table 3); extent of ctenoid scales on body (ctenoid scales beginning at 1-3, usually 2 transverse scale rows behind gill opening in *C. bibulus* and *C. clibanarius*, versus 3-8, usually 4-6 rows in *C. johnvoelckeri* and 6-15 rows in *C. auratus*; Table 6); transverse scale series counts (16-19, usually 17-18 in *C. auratus*, 18-21, usually 19-20 in *C.*

bibulus, 18-21, usually 18-20 in *C. clibanarius* and 18-22, usually 19-21 in *C. johnvoelckeri*; Table 4); and circumpeduncle scales (20-21 usually 20 in *C. auratus*, 20-23, usually 20 in *C. clibanarius*, 20-23 in *C. bibulus*, and 22-25, usually 23-24 in *C. johnvoelckeri*; Table 5).

Although the 4 species generally agree in morphometric values, *C. bibulus* and *C. clibanarius* differ from *C. auratus* and *C. johnvoelckeri* in often having the anterior few segmented dorsal-fin rays elongated (first segmented dorsal-fin ray 11.1-18.7 % SL in *C. bibulus*, and 10.0-24.2 % SL in *C. clibanarius*, versus 7.7-10.7 % SL in *C. auratus*, and 8.5-10.7 % SL in *C. johnvoelckeri*).

The 4 species also differ markedly from each other (and from other congeners) in live and preserved coloration. In *C. auratus* (Pls 1B-C) the head and body are generally brown (golden yellow to orange in life), with 4 or 5 pale yellow to pale brown (bright orange to bright red in life) stripes on the head and anterior part of the body; the dorsal and anal fins are greyish brown to pale brown (reddish to orangish hyaline in life); and the caudal fin is greyish brown basally (bright orange to bright red in life), with the remainder of the fin pale brown to hyaline (orangish hyaline in life). In *C. bibulus* (Pl. 1D) the head and body are pale yellow to pale brown (in life pinkish white to blue or olive-green, pink on head and chest in small juveniles, with the snout, chin, lips, interorbital and occiput abruptly dusky orange to bright reddish orange), with 3 dark brown to dark greyish brown stripes (dusky orange to dark grey or black in life), one from upper rear of orbit beneath dorsal-fin base to dorsal edge of caudal fin, one from upper part of operculum, above pectoral-fin base along midside to the middle of the caudal-fin base, and one from pectoral-fin base along anal-fin base to lower part of the caudal fin; dorsal and anal fins are dark brown to dark greyish brown basally (dusky grey to black in life), pale brown to hyaline on remainder of fins (in life greenish to pinkish hyaline, with distal edge and fin rays pink to mauve or magenta); caudal fin is pale yellow to pale brown on its base (white to pinkish green in life), with middle dark stripe from body ending abruptly in a spot on fin base, this encircled posteriorly around rear edge of scaly sheath by converging upper and lower dark stripes from body; rear of caudal fin pale brown to hyaline (pink to pinkish hyaline in life). In *C. clibanarius* (Pl. 2B) the head and body are pale brown to brown (in life, pale green to olive or bright green, with yellow to bright orange or bright red stripes on head and front of body, and snout and anteroventral part of head reddish grey to bright red), with bases of scales edged with dark brown (dark olive-grey in life), giving a reticulated pattern; dorsal and anal fins dark brown to dark grey basally (bluish grey to olive in life) and greyish to brownish hyaline distally; scaly sheath of caudal fin similar to body coloration, and edged posteriorly with dark brown to grey (olive-grey in life), with remainder of fin greyish to brownish hyaline. In *C. johnvoelckeri* (Pl. 2F) the head and body are pale yellow to pale brown (cerise pink to magenta in life), with scales behind pectoral base each with a brown to greyish brown basal spot (purple to dark grey in life), forming a weak reticulated pattern; dorsal and anal fins dusky grey to dark grey (in life, dark grey with greenish iridescence basally, followed distally by bright red or magenta, then pinkish hyaline, then bluish grey with a pale pink distal margin); caudal fin is pale yellow to pale brown basally, becoming dark grey dorsally, ventrally and posteriorly (in life, the scales are magenta, with the basal three-quarters of the fin deep purplish blue, and the margins magenta).

REMARKS: *Chlidichthys auratus* is a relatively small species; the largest specimen examined is 39.0 mm SL. Colour photographs of the species are provided by Lubbock (1975), Edwards & Randall (1983) and Randall (1983).

ETYMOLOGY: The specific epithet is from the Latin for golden, and alludes to the live coloration.

MATERIAL EXAMINED: GULF OF AQABA: USNM 211781, 10: 25.5-35.3 mm SL, bay at El Himeira, 0-18 m, V.G. Springer et al., 16 July 1969; USNM 211779, 1: 28.3 mm SL (paratype), El Himeira, 0-16 m, V.G. Springer et al., 19 July 1968; USNM 211778, 4: 32.9-39.0 mm SL (paratypes), Strait of Jubal, Ras Muhammad, 0-9 m, V.G. Springer et al., 26 September 1969; USNM 211780, 2: 37.5-37.8 mm SL mm SL (cleared and stained), just N of Ras Burqa, 0-10.5 m, V.G. Springer et al., 23 July 1969. SAUDI ARABIA: BMNH 1973.12.20.180, 1: 25.6 mm SL, Jiddah (Jedda, Jeddah), Al Korae, 30 m, R. Lubbock & R. Sankey, April 1973; USNM 290772, 1: 30.3 mm SL, reef on N side of Jiddah harbour, 1.8-6 m, W.F. Smith-Vaniz, 11 April 1977. SUDAN: BMNH 1973.12.20.172, 1: 32.4 mm SL (holotype), BMNH 1973.12.20.173-179, 7: 26.5-34.0 mm SL (paratypes), Port Sudan, 25 m, R. Lubbock & P. Etherington-Smith, August 1972. ERITREA: USNM 290320, 2: 29.7-33.3 mm SL, USNM 290685, 1: 32.4 mm SL, just W of S end of Harat Id, 16°08'N 039°26'30"E, ca. 4 m, V.G. Springer, 14 August 1969. YEMEN: SMF 28869, 1: 33.5 mm SL, Karaman Archipelago, Kadaman Id (15°34'N 42°32'E), reef, 2-4 m, U. Zajonz & P.C. Heemstra, 3 April 1998.

Chlidichthys bibulus (Smith)
Threestripe Dottyback
Fig. 3; Pl. 1D

Wamizichthys bibulus Smith, 1954: 205, fig. 3 (type locality, Wamizi Id, Mozambique; holotype, RUSI 144); Smith, 1955: 309 (Aldabra).

Chlidichthys bibulus: Lubbock, 1977: 14, pl. 14b (description; distribution); Smith, 1986: 540, pl. 46, fig. 169.2 (compilation); Gill & Randall, 1994: 12, 15 (generic classification; comparison); Lieske & Myers, 1996: pl. 33, fig. 5 (habitat and distribution; col. fig.); Gill & Edwards, 1999: 146 (list).

DIAGNOSIS: A species of *Chlidichthys* with the following combination of characters: dorsal-fin rays II,23; anal-fin rays II-III,13-15, usually III,14; pectoral-fin rays 16-18,

usually 17; ctenoid scales beginning at 1-3, usually 2 transverse scale rows behind gill opening; and circumpeduncle scales 20-23. It also has distinctive preserved and live colorations: head and body pale yellow to pale brown (in life pinkish white to blue or olive-green, pink on head and chest in small juveniles, with snout, chin, lips, interorbital and occiput abruptly dusky orange to bright reddish orange), with 3 dark brown to dark greyish brown stripes (dusky orange to dark grey or black in life), one from upper rear of orbit beneath dorsal-fin base to dorsal edge of caudal fin, one from upper part of operculum, above pectoral fin base along midside to middle of caudal-fin base, and one from pectoral-fin base along anal-fin base to lower part of caudal fin; dorsal and anal fins dark brown to dark greyish brown basally (dusky grey to black in life), pale brown to hyaline on remainder of fin (in life greenish to pinkish hyaline, with distal edge and fin rays pink to mauve or magenta); caudal fin pale yellow to pale brown on base (white to pinkish green in life), with middle dark stripe from body ending abruptly in spot on fin base, this encircled posteriorly around rear edge of scaly sheath by converging upper and lower dark stripes from body; rear of caudal fin pale brown to hyaline (pink to pinkish hyaline in life).

DESCRIPTION (based on 13 specimens, 25.7-50.4 mm SL): Dorsal-fin rays II,23, last 4-7 (?) rays branched; anal-fin rays II-III,13-15 (III,14), last 3-6 (?) rays branched; pectoral-fin rays 16-18 (17/17), upper 2-5 (3/2) and lower 2-5 (2/3) rays unbranched; pelvic-fin rays I,4, all rays unbranched; principal caudal-fin rays 9 + 8, the uppermost 2 (?) and lowermost 2 rays unbranched; upper procurrent caudal-fin rays 5-6 (5); lower procurrent caudal-fin rays 4-5; total caudal-fin rays 26-28 (27); lateral scale series 45-48 (45/47); predorsal scales 12-16 (13); transverse scale series 18-21 (19/19); scales behind eye 2-3 (3); scales to preopercle angle 3-5 (4); circumpeduncle scales 20-23 (23); ctenoid scales beginning at 1-3 (2/2) transverse scale rows behind gill opening; gill-rakers 4-5 + 10-12 = 14-17 (4 + 11); pseudobranch filaments 6-8 (8).

Head pores (all bilaterally paired except posterior interorbital pores): nasal pores 2; anterior interorbital pores 1; posterior interorbital pores 0-1 (0); supraotic pores 2; suborbital pores 7; posterior otic pores 0; preopercle pores 6; dentary pores 3-4 (4/4); intertemporal pores 0-1 (1/1); anterior temporal pores 0-1 (0/0); posttemporal pores 1; parietal pores 2.

As percentage of standard length (based on 10 specimens, 25.7-50.4 mm SL): body depth at dorsal-fin origin 20.6-24.5 (20.6); greatest body depth 21.1-28.0 (21.6); body width 10.7-12.1 (11.1); head length 26.8-29.6 (27.0); snout 4.7-5.6 (5.4); orbit diameter 8.5-10.5 (9.2); interorbital width 3.4-3.9 (3.6); upper jaw 9.1-10.4 (9.9); caudal peduncle depth 13.3-15.2 (14.3); caudal peduncle length 10.3-12.5 (10.7); predorsal 29.1-32.6 (29.1); preanal 56.0-61.1 (59.5); prepelvic 26.6-29.9 (28.5); first segmented dorsal-fin ray 11.1-18.7 (broken in holotype); third from last segmented dorsal-fin ray 11.9-15.2 (broken in holotype); dorsal-fin base 58.8-63.3 (60.6); first segmented anal-fin ray 7.0-11.1 (broken in holotype); third from last segmented anal-fin ray 12.2-14.8 (broken in holotype); anal-fin base 28.4-32.1 (31.3); caudal fin 19.6-22.2 (broken in holotype); pectoral fin 16.5-19.5 (17.1); pelvic fin 20.2-22.2 (broken in holotype).

Lower lip incomplete; sensory canal of infraorbital 1 not continuous with sensory canal of infraorbital 3; fin spines weak and flexible; anterior dorsal-fin pterygiophore formula S/S/3/1 + 1 or S/S/S + 3/1 + 1 (S/S/3/1 + 1); 15-16 (15) consecutive dorsal-fin pterygiophores inserting in 1:1 relationship directly behind neural spine 4; anterior anal-fin pterygiophore formula 3/1 + 1, 3/1/1 + 1 or /3 + 1 + 1 (3/1 + 1); 6-7 (7) consecutive anal-fin pterygiophores inserting in 1:1 relationship directly behind haemal spine 2; second segmented pelvic-fin ray longest; caudal fin weakly rounded to truncate; dorsal and anal fins without distinct scaly sheath, although some fish with a few scales overlapping fin bases; anterior lateral line represented by single tubed scale at gill opening, followed by intermittent series of centrally pitted scales, which terminate beneath segmented dorsal-fin ray 16-23 (21/22); second intermittent series of centrally pitted scales originating on midside at point varying from above middle of abdomen to above anterior part of anal fin, extending on to middle part of caudal-fin base; additional 1-2 centrally pitted scales present above and below pitted scale(s) on middle part of caudal-fin base; scales present on cheeks (extending posteriorly over dorsal part of preopercle) and operculum; predorsal scales extending to interorbital commissure (at point ranging from about half to two thirds distance from anterior supraotic pore to anterior interorbital pore); vertebrae 10 + 17; epurals 3; epineurals present on vertebrae 1 through 13-17 (1 through 14); ribs present on vertebrae 3 through 10, the final rib relatively long.

Upper jaw with 3-5 pairs of curved, enlarged caniniform teeth anteriorly, the medial pair smallest, and 5-6 (at symphysis) to 1-3 (on sides of jaw) irregular inner rows of small conical teeth, the teeth on outer row of conical teeth largest; lower jaw with 2-5 pairs of curved, enlarged caniniform teeth, the medial pair smallest, and 3-5 (at symphysis) to 1 (on sides of jaw) irregular inner rows of small conical teeth, the conical teeth gradually increasing in size and becoming more curved and caniniform on middle part of jaw, then becoming abruptly smaller on rear part of jaw; vomer with 1-2 rows of small conical teeth arranged in a chevron; palatines with 1-2 irregular rows of small conical teeth in an elongate patch; tongue pointed, without teeth.

Live coloration (based on description by Smith, 1954, illustration in Lubbock, 1977, and colour photographs of a fresh specimen from Kenya; Pl. 1D): head and body pinkish white to blue or olive-green, pink on head and chest in small juveniles; snout, chin, lips, interorbital and occiput abruptly dusky orange to bright reddish orange; cheeks dusky olive to dusky orange; orbital rim narrowly grey, bordered posteriorly and ventrally with pale grey to olive; iris orange to bright red, dusky on

outer edge; dark grey to black stripe extending from upper rear of orbit beneath dorsal-fin base to dorsal part of caudal fin, stripe narrow anteriorly; second dark stripe extending from upper part of operculum, above pectoral-fin base along midside to middle of caudal-fin base; stripe dusky orange to dark grey on head, dark grey to black on body; third dark stripe extending from or behind lower part of pectoral-fin base to anal-fin base, then along anal-fin base to lower part of caudal-fin base; dorsal and anal fins dusky grey to black basally, this coloration broadening posteriorly and extending along length of final 2 rays, sometimes with narrow pale blue to white stripe along extreme base of fins, the remainder of fin greenish to pinkish hyaline, with distal edge and fin rays pink to mauve or magenta; caudal fin white to pinkish green on base, with middle dark stripe from body ending abruptly in black spot, this encircled posteriorly around rear edge of scaly sheath by converging upper and lower dark stripes from body; rear part of caudal fin pink to pinkish hyaline; pectoral fins pinkish to orangish hyaline; pelvic fins pale blue to pink.

Preserved coloration: pattern generally similar to live coloration, head and body becoming pale yellow to pale brown; dark stripes and other markings on head, body and median fins become dark brown to dark greyish brown, usually darker on scale margins; midlateral dark stripe on body sometimes extending only to hypural edge, with separate dark spot on caudal-fin base; pectoral, pelvic and outer parts of dorsal, anal and caudal fins pale brown to hyaline.

HABITAT AND DISTRIBUTION: *Chlidichthys bibulus* is known only from Socotra, Kenya to Mozambique, and Aldabra (Fig. 3). Smith (1954: 199, 208) noted that it occurs on shallow coral reefs, "almost to low tide mark;" however, a more recent collection of the species was made from caves in a reef in 25 m.

COMPARISONS: This species resembles *C. auratus* from the Red Sea, *C. clibanarius* from the Comoro Ids, Madagascar and Aldabra, and *C. johnvoelckeri* from east Africa and the Comoro Ids in most meristic and morphometric values. Characters distinguishing the 4 species are discussed under Comparisons for *C. auratus*.

REMARKS: *Chlidichthys bibulus* is a relatively large species; the largest specimen examined is 50.4 mm SL. A colour illustration of the holotype by M.M. Smith is given in Lubbock (1977) (reproduced elsewhere, for example, in Smith, 1986, and presumably forming the basis of the illustration in Lieske & Myers, 1996).

ETYMOLOGY: The specific epithet, from the Latin meaning "drinking much" or "fond of drink," presumably alludes to the red snout and eyes.

MATERIAL EXAMINED: RUSI 3619, 3: 37.3-46.2 mm SL (paratypes), no precise data, J.L.B. & M.M. Smith, 1951; RUSI 3620, 1: 31.3 mm SL, no precise data, J.L.B. Smith. SOCOTRA ARCHIPELAGO, YEMEN: SMF 29235, 1: 34.7 mm SL, SW coast of Socotra Id, Ras Qatanin Bay, 12°21'17"N 53°32'39"E, large boulder, 8-11 m, U. Zajonz & N. Fouad, 9 April 2000. KENYA: RUSI 3617, 1: 50.4 mm SL (paratype), Shimoni, 04°39'S 39°23'E, J.L.B. Smith, 19 August 1954; BPBM 27310, 3: 25.7-40.2 mm SL, Watamu Marine Reserve (27 km S of Malindi), caves in reef, 25 m, J.E. Randall & G.R. Allen, 25 March 1979. TANZANIA: RUSI 3616, 1: 35.9 mm SL (paratype), Zanzibar Id, 06°10'S 39°11'E, J.L.B. Smith, 7 September 1952. MOZAMBIQUE: RUSI 144, 1: 46.7 mm SL (holotype), Querimba Archipelago, Wamizi Id, 11°00'S 040°40'E, in fairly shallow water in coral, J.L.B. & M.M. Smith, 1951; RUSI 3618, 1: 44.5 mm SL (paratype), Querimba Archipelago, Metimo Id, 12°15'07"S 40°34'38"E, J.L.B. Smith, 18 August 1951. SEYCHELLES IDS: RUSI 3615, 1: 39.2 mm SL, Aldabra Id, J.L.B. Smith, November 1954.

Chlidichthys cacatuoides Gill & Randall
Cockatoo Dottyback
Figs 1C, 2C, 5; Pl. 1E

Chlidichthys cacatuoides Gill & Randall, 1994: 13, figs. 2 and 3 (type locality: Sawda Id, Al Hallaniyah Ids, Oman; holotype, BPBM 36048); Randall, 1995: 144, fig. 343 (description; distribution; col. fig.); Gill & Edwards, 1999: 146 (list).

DIAGNOSIS: A species of *Chlidichthys* with the following combination of characters: predorsal scales extending to supratemporal commissure; dorsal-fin rays II,23-24; ctenoid scales beginning at 17-20 transverse scale rows behind gill opening; and gill-rakers 3 + 9-10. It is also distinctive in having the anterior 4-5 segmented dorsal-fin rays elongate to very elongate, first segmented ray 16.2-39.0 % SL.

DESCRIPTION (based on 5 specimens, 10.6-37.6 mm SL): Dorsal-fin rays II,23-24, last 7-8 rays branched (all rays unbranched in 10.6 mm SL paratype); anal-fin rays III,14-15, last 5-7 rays branched (all rays unbranched in 10.6 mm SL paratype); pectoral-fin rays 17-18, upper 2-3 (3/3) and lower 2-3 (2/2) rays unbranched; pelvic-fin rays I,4, all rays unbranched; principal caudal-fin rays 9 + 8, the upper 2 and lower 2 rays unbranched (all principal rays unbranched in 10.6 mm SL paratype); upper procurrent caudal-fin rays 4-5 (5); lower procurrent caudal-fin rays 4-5 (4); total caudal-fin rays 25-27 (26); lateral scale series 37-40 (40/40); predorsal scales 7-9 (8); transverse scale series 17-20 (18/18); scales behind eye 2; scales to preopercle angle 3-4 (4); circumpeduncle scales 18-20 (20); ctenoid scales beginning at 17-20 (17/18) transverse scale rows behind gill opening; gill-rakers 3 + 9-10 (3 + 10); pseudobranch filaments 7-9 (9).

Head pores (all bilaterally paired except posterior interorbital pores; Fig. 1C): nasal pores 2; anterior interorbital pores 1; posterior interorbital pores 0; supraotic pores 2; suborbital pores 6; posterior otic pores 0; preopercle pores 6; dentary pores 4; intertemporal pores 1; anterior temporal pores 0; posttemporal pores 1;

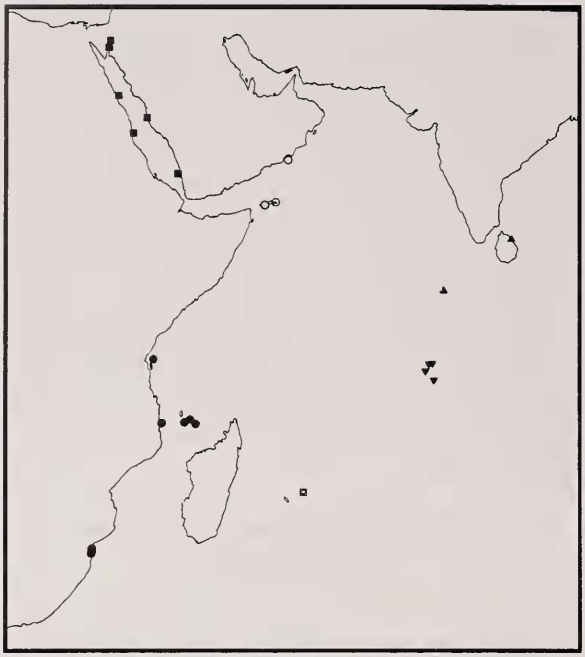

Figure 5. Distributional records for *Chlidichthys cacatuoides* (open circles), *C. chagosensis* (descending triangles), *C. inornatus* (ascending triangles), *C. pembae* (closed circles), *C. rubiceps* (closed squares) and *C. smithae* (open square).

parietal pores 2.

As percentage of standard length (based on 4 specimens, 25.9-37.6 mm SL): body depth at dorsal-fin origin 24.7-26.1 (26.1); greatest body depth 25.0-27.7 (27.7); body width 11.1-12.4 (12.2); head length 30.1-31.4 (31.4); snout 5.6-6.4 (6.4); orbit diameter 8.2-9.2 (8.6); interorbital width 3.8-4.0 (3.8); upper jaw 10.8-11.2 (11.2); caudal peduncle depth 16.2-16.9 (16.2); caudal peduncle length 9.0-9.1 (9.0); predorsal 29.8-30.9 (30.9); preanal 57.4-63.3 (57.4); prepelvic 29.3-30.2 (30.0); first segmented dorsal-fin ray 16.2-39.0 (30.6); third from last segmented dorsal-fin ray 16.7-18.3 (17.6); dorsal-fin base 61.0-64.2 (63.8); first segmented anal-fin ray 10.6-13.8 (10.6); third from last segmented anal-fin ray 16.0-16.7 (16.0); anal-fin base 30.9-33.9 (30.9); caudal fin 22.3-23.1 (22.3); pectoral fin 16.9-18.7 (17.3); pelvic fin 25.0-30.1 (25.0).

Lower lip incomplete; sensory canal of infraorbital 1 continuous with sensory canal of infraorbital 3 (Fig. 2C); fin spines weak and flexible; anterior dorsal-fin pterygiophore formula S/S/3/1 + 1; 15-17 (17) consecutive dorsal-fin pterygiophores inserting in 1:1 relationship directly behind neural spine 4; anterior anal-fin pterygiophore formula 3/1 + 1 or /3 + 1 + 1 (3/1 + 1); 8 consecutive anal-fin pterygiophores inserting in 1:1 relationship directly behind haemal spine 2; second segmented pelvic-fin ray longest; caudal fin rounded with truncate posterior margin; dorsal and anal fins without distinct scaly sheath, although with a few scales overlapping fin bases; anterior lateral line represented by single tubed scale at gill opening, followed by intermittent series of centrally pitted scales, which terminate beneath segmented dorsal-fin ray 19-22 (22/21); second intermittent series of centrally pitted scales originating on midside above anterior part of anal fin, extending on to middle part of caudal-fin base; additional 1-2 centrally pitted scales present above and below pitted scale(s) on middle part of caudal-fin base; scales present on cheeks (not extending posteriorly over dorsal part of preopercle) and operculum; predorsal scales extending to supratemporal commissure (Fig. 1C); vertebrae 10 + 18-19 (10 + 18); epurals 3; epineurals present on vertebrae 1 through 16-17 (16); ribs present on vertebrae 3 through 10, the final rib relatively long.

Upper jaw with 2-4 pairs of curved, enlarged caniniform teeth anteriorly, the medial pair smallest, and 4-5 (at symphysis) to 2 (on sides of jaw) irregular inner rows of small conical teeth, the teeth of outer row of conical teeth largest; lower jaw with 3-4 pairs of curved, enlarged caniniform teeth, the medial pair smallest, and 3-4 (at symphysis) to 1 (on sides of jaw) irregular inner rows of small conical teeth, the conical teeth gradually increasing in size and becoming more curved on middle part of jaw, then becoming abruptly smaller on rear part of jaw; vomer with 1-2 irregular rows of small, stout conical teeth arranged in a chevron; palatines with a single irregular row of small conical teeth; tongue pointed, without teeth.

Live coloration (based on colour transparencies of holotype and a paratype from southern Oman and of a specimen from Socotra when freshly dead; Pl. 1E): head and body pale greyish brown to bright orange-yellow, greyish brown to pinkish or yellowish brown behind pectoral-fin base, becoming reddish to orangish brown on nape and dorsal part of body; posterior orbital rim, preopercle and sometimes rear edge of operculum bright orange-yellow with diffuse grey undertones; bright orange-yellow of orbital rim sometimes edged posteriorly and ventrally with pale blue to mauve; dusky to dark grey bar sometimes present on posterior orbital rim between bright orange-yellow and pale blue to mauve markings; upper lip and maxilla sometimes reddish to pinkish brown, becoming pale grey anteriorly, or uniformly bright orange-yellow; iris red to yellow, becoming greyish brown dorsally and bright orange-yellow posteriorly and sometimes ventrally; scales of body each with small reddish to pinkish brown basal spot; pectoral-fin base dusky grey-brown to greyish yellow or bright orange yellow; dorsal-fin rays reddish, orangish or greenish brown, edged in pale bluish grey; basal third of dorsal fin pale grey to grey, the outer two-thirds dusky hyaline to grey, sometimes with dusky grey to grey-brown triangular marking basally behind each ray; pale grey to grey basal area of dorsal fin sometimes edged distally by narrow pale blue stripe, this in turn edged by narrow reddish brown stripe, with second, narrow reddish brown stripe submarginally near distal edge of fin; anal fin similar to dorsal fin, except with indistinct yellowish grey spots between bases of fin rays, without pale blue stripe on basal third of fin, and with distal margin of fin narrowly pale blue; caudal-fin rays pinkish to pale greenish brown; basal third of caudal fin greyish brown to olive with reddish brown to pinkish brown basal spot on each scale, the remainder of fin

hyaline to dark grey; pectoral fins pinkish hyaline; pelvic fins pale blue.

Preserved coloration: pattern generally similar to live coloration, head and body becoming pale yellow to pale brown, with remainder of body greyish brown; posterior orbital rim, preopercle, operculum and pectoral-fin base become greyish brown to dark greyish brown; basal spots on caudal-fin and body scales become dark greyish brown; triangular markings on dorsal- and anal-fin bases become dark grey; pale blue markings on fins and head become pale brown to pale grey.

HABITAT AND DISTRIBUTION: This species was previously known only from the 3 type specimens from off the southwest edge of Sawda Id, Al Hallaniyah (Kuria Muria) Ids, southern Oman. Its range is extended here to Socotra on the basis of 2 specimens collected by U. Zajonz and collaborators (Fig. 5). It has been collected from reefs in 15-29 m.

COMPARISONS: *Chlidichthys cacatuoides* differs from all other congeners except *C. chagosensis* from the Chagos Archipelago, *C. inornatus* from the Maldive Ids and Sri Lanka and *C. rubiceps* from the Red Sea in having the predorsal scales extending only to the supratemporal commissure (versus to the interorbital commissure in other congeners; Fig. 1). Comparisons between the 4 species are treated here. *Chlidichthys cacatuoides*, *C. inornatus* and *C. rubiceps* are distinguished from *C. chagosensis* in the structure of the infraorbital bones. In *Pectinochromis* and *Chlidichthys*, infraorbital 2 is either reduced, lacking a sensory canal (*Pectinochromis*; Fig. 2D), or absent (*Chlidichthys*; Figs 2A-C). Primitively in *Chlidichthys*, the sensory canal of infraorbital 1 does not communicate with the sensory canal in infraorbital 3, and there is an external pore opening at the terminus of each bone (Fig. 2A); the total number of suborbital pores is usually 7 (Table 9). In *C. cacatuoides*, *C. inornatus* and *C. rubiceps* infraorbitals 1 and 3 are more closely applied, often in direct contact, and the sensory canal is continuous through the 2 bones (Fig. 2C). There is a single pore at the junction of the 2 bones, leading to 1 fewer pore (thus a total of 6) in the suborbital series (Figs 1C, 2C; Table 9); some specimens may have 7 pores owing to the presence of additional pores elsewhere in the series. Most specimens of *C. chagosensis* have the primitive arrangement of head pores and infraorbital bones (Figs 1B, 2B; Table 9). However, occasional specimens may have the derived arrangement (i.e., canals continuous, with a single pore at the junction of the bones); of 66 type and non-type specimens examined for the condition of infraorbitals 1 and 3, 55 had the primitive arrangement bilaterally, 5 had the derived arrangement unilaterally, and 6 had the derived arrangement bilaterally.

With the exception of the arrangement of the infraorbital bones and associated pores, *C. chagosensis* closely resembles *C. inornatus* in most meristic and morphometric values, and these 2 species have been previously confused under the latter name. They differ slightly in 2 meristic characters (*C. inornatus* has modally one more scale in lateral series and one more gill-raker than *C. chagosensis*; Tables 3, 7), but there is broad overlap in both of these characters. *Chlidichthys chagosensis* and *C. inornatus* are distinguished from *C. cacatuoides* and *C. rubiceps* in having: usually 17 caudal vertebrae (versus 18-19 in *C. cacatuoides* and 18 in *C. rubiceps*; Table 14); usually 22 segmented dorsal-fin rays (versus usually 23 in *C. cacatuoides* and *C. rubiceps*; Table 1); and usually 13 segmented anal-fin rays (versus usually 14 in *C. cacatuoides* and *C. rubiceps*; Table 1). *Chlidichthys cacatuoides* is further distinguished from these species and from *C. rubiceps* in having 3 + 9-10 gill-rakers (versus 3-4 + 9-11 = 12-15, usually 3-4 + 10-11 = 13-14 in *C. chagosensis*, 3-4 + 10-12 = 13-16, usually 3-4 + 11-12 = 14-15 in *C. inornatus* and 3-6 + 11-13 = 14-19 in *C. rubiceps*; Table 7); and ctenoid scales beginning 17-20 transverse scale rows behind gill opening (versus 8-14 rows in *C. chagosensis*, 8-15 rows in *C. inornatus* and 9-17 rows in *C. rubiceps*; Table 6). In addition, *C. cacatuoides* differs from these species and all other pseudoplesiopines in having the anterior 4 or 5 segmented dorsal-fin rays elongate to greatly elongate, though this is best developed in larger specimens (first segmented ray 16.2-39.0 % SL, 30.6-39.0 % SL in specimens larger than 35 mm SL). Although several *Chlidichthys* species (particularly *C. abruptus*, *C. bibulus*, *C. clibanarius* and *C. rubiceps*) may have elongated anterior dorsal-fin rays, they are generally shorter than in *C. cacatuoides* (first segmented ray 7.3-15.6 % SL in *C. abruptus*, 11.1-18.7 % SL in *C. bibulus*, 10.0-24.2 % SL in *C. clibanarius* and 12.0-21.3 % SL in *C. rubiceps*).

REMARKS: Colour photos of *C. cacatuoides* are provided in Gill & Randall (1994) and Randall (1995). Gill & Randall (1994) proposed that the species is sexually dimorphic. However, this conclusion was based on only 2 adults; further studies are needed in order to confirm whether the slight coloration differences noted between the specimens are due to sexual dimorphism.

ETYMOLOGY: The specific epithet is considered a noun in apposition derived from *Cacatua*, an Australasian genus of crested parrots (cockatoos), and the Greek stem *oides*, meaning "like," and alludes to the crest-like, elongate anterior dorsal-fin rays.

MATERIAL EXAMINED: OMAN: BMNH 1994.4.19.1, 1: 37.2 mm SL (paratype, subsequently cleared and stained), BPBM 36048, 1: 37.6 mm SL (holotype), BPBM 36314, 1: 10.6 mm SL (paratype), Al Hallaniyah Ids, off SW side of Sawda Id, edge of rocky bottom and adjacent sand and rubble, 21 m, rotenone, J.E. Randall, J.L. Earle, G. Rhodes & D.M. Hardy, 7 November 1993. SOCOTRA ARCHIPELAGO, YEMEN: SMF 29217, 1: 25.9 mm SL, Socotra Id, Ditimi, W of Rhiy di-Abho, 12°37'21"N 54°17'17"E, reef slope with rich coral on rock, 15-20 m, U. Zajonz & M. Apel, 4 March 1999; SMF 29231, 1: 30.5 mm SL, NE coast of Darsa Id at anchorage, 12°07'03"N 53°18'18"E, small coral blocks on slightly sloping sand bottom, 27-29 m, U. Zajonz, 8 April 2000.

Chlidichthys chagosensis **new species**
Chagos Dottyback
Figs 1B, 2B, 5; Pls 1F, 2A

Pseudoplesiops typus [non Bleeker, 1858]: Regan, 1908: 228 (description; Diamant Id, Chagos Archipelago).
Chlidichthys inornatus [non Lubbock, 1976]: Lubbock, 1976: 169 (in part, paratypes from Chagos Archipelago); Lubbock, 1977: 16 (in part, comparison); Winterbottom et al., 1989: 28, fig. 152 (Chagos Archipelago; habitat preference); Mooi, 1990: 457, fig. 2c-d, tabs 1,3 (egg surface morphology); Winterbottom & Anderson, 1997: 8 (Chagos); Winterbottom & Anderson, 1999: 109 (Chagos); Gill & Edwards, 1999: 144 (osteological material examined list).

HOLOTYPE: ROM 72506, 20.9 mm SL, Chagos Archipelago, Peros Banhos Atoll, Isle Du Coin, about 700 m directly off jetty near Bamburi (05°25'36"S 071°45'53"E), small coral knoll in lagoon, 25 m, R. Winterbottom, 3 March 1979.

PARATYPES (all from Chagos): AMS I.23653-003, 1: 27.9 mm SL (cleared and stained), Salomon Atoll, 18-25 m, R. Winterbottom & A. Emery, 23 March 1979; BMNH 1908.3.23.96, 1: 31.3 mm SL (also paratype of *C. inornatus*), Diamant Id, ca. 30 m, J.S. Gardiner; BMNH 1986.2.3.3-8, 6: 20.8-28.4 mm SL, Salomon Atoll, off W (ocean) side of Isle Anglaise near middle of its length (05°19'23"S 072°13'32"E), 7-10 m, R. Winterbottom & A. Emery, 16 March 1979; BMNH 1986.2.3.22-30, 9: 20.0-31.0 mm SL, Salomon Atoll, N side of Isle Diabole (05°20'39"S 072°12'33"E), drop-off, 20-26 m, R. Winterbottom & A. Emery, 17 March 1979; ROM 857CS, 3: 28.6-30.0 mm SL (cleared and stained), Salomon Atoll, 0.75 km NE of jetty on Isle Boddam (05°21'18"S 072°12'58"E), lagoon, 9-13 m, R. Winterbottom, A. Emery et al., 14 March 1979; ROM 46322, 2: 19.1-25.0 mm SL, collected with holotype; ROM 72507, 5: 20.7-29.2 mm SL, Peros Banhos Atoll, Isle Du Coin, 45 m SE of jetty in lagoon (05°25'55"S 071°45'46"E), *Acropora* reef, 10 m, R. Winterbottom, 5 February 1979; USNM 212266, 1: 26.6 mm SL (also paratype of *C. inornatus*), Diego Garcia Atoll, reef on NW side of atoll lagoon (07°15'20"S 072°22'42"E), 0-3 m, H.A. Fehlmann & C.F. Rhyne, 15 June 1967; USNM 212268, 1: 29.6 mm SL (also paratype of *C. inornatus*), Diego Garcia Atoll, ca. 1.5 km N of E point on reef off E shore of lagoon (07°20'10"S 072°27'49"E), 0.6-2.4 m, H.A. Fehlmann & G. Payet, 7 July 1967.

DIAGNOSIS: A species of *Chlidichthys* with the following combination of characters: predorsal scales extending to supratemporal commissure; suborbital pores 6-8, usually 7; and sensory canal of infraorbital 1 usually not continuous with adjacent infraorbital (infraorbital 3).

DESCRIPTION (based on 30 specimens, 20.0-31.3 mm SL): Dorsal-fin rays II,22, last 6-8 (6) rays branched; anal-fin rays III,13, last 5-6 (5) rays branched; pectoral-fin rays 16-18 (18/17), upper 3-4 (4/3) and lower 2-4 (?/4) rays unbranched; pelvic-fin rays I,4, all rays unbranched; principal caudal-fin rays 9 + 8, the uppermost 2-3 (2) and lowermost 1-2 (2) rays unbranched; upper procurrent caudal-fin rays 4-5 (5); lower procurrent caudal-fin rays 4-5 (5); total caudal-fin rays 25-27 (27); lateral scale series 35-43 (39/41); predorsal scales 6-10 (9); transverse scale series 14-18 (16/15); scales behind eye 2; scales to preopercle angle 3-4 (3); circumpeduncle scales 18-20 (20); ctenoid scales beginning at 8-14 (11/11) transverse scale rows behind gill opening; gill-rakers 3-4 + 9-11 = 12-15 (3 + 11); pseudobranch filaments 5-8 (6).

Head pores (all bilaterally paired except posterior interorbital pores; Fig. 1B): nasal pores 2; anterior interorbital pores 1-2 (1/1); posterior interorbital pores 0; supraotic pores 2; suborbital pores 6-8 (7/7); posterior otic pores 0; preopercle pores 6; dentary pores 4; intertemporal pores 1; anterior temporal pores 0; posttemporal pores 1; parietal pores 2.

As percentage of standard length (based on 17 specimens, 20.0-31.0 mm SL): body depth at dorsal-fin origin 21.5-26.0 (24.4); greatest body depth 22.6-28.9 (26.3); body width 10.5-12.4 (12.4); head length 28.2-33.3 (32.5); snout 4.9-6.0 (5.7); orbit diameter 8.8-11.0 (11.0); interorbital width 3.4-4.8 (4.3); upper jaw 10.5-11.5 (11.5); caudal peduncle depth 12.4-16.2 (15.3); caudal peduncle length 10.5-12.1 (11.5); predorsal 31.2-35.7 (35.4); preanal 58.5-62.7 (61.2); prepelvic 28.5-31.9 (30.6); first segmented dorsal-fin ray 8.7-10.9 (9.1); third from last segmented dorsal-fin ray 14.4-16.9 (14.4); dorsal-fin base 56.5-61.3 (56.5); first segmented anal-fin ray 10.8-13.2 (11.5); third from last segmented anal-fin ray 13.4-15.8 (13.9); anal-fin base 23.9-29.8 (27.8); caudal fin 21.3-24.3 (21.5); pectoral fin 18.1-21.6 (20.1); pelvic fin 23.0-28.9 (26.8).

Lower lip incomplete; sensory canal of infraorbital 1 usually not continuous with sensory canal of infraorbital 3 (Fig. 2B), continuous unilaterally or bilaterally in some specimens (not continuous bilaterally in holotype); fin spines weak and flexible; anterior dorsal-fin pterygiophore formula S/S/3/1 + 1; 14-16 (15) consecutive dorsal-fin pterygiophores inserting in 1:1 relationship directly behind neural spine 4; anterior anal-fin pterygiophore formula 3/1 + 1; 6-7 (7) consecutive anal-fin pterygiophores inserting in 1:1 relationship directly behind haemal spine 2; second segmented pelvic-fin ray longest; caudal fin rounded to truncate or emarginate; dorsal and anal fins without well-developed scaly sheath, although some fish with a few scales overlapping fin bases; anterior lateral line represented by single tubed scale at gill opening, followed by intermittent series of centrally pitted scales, which terminate beneath segmented dorsal-fin ray 17-22, or extend slightly behind dorsal-fin termination (terminating beneath segmented dorsal-fin ray 18/21 in holotype); second intermittent series of centrally pitted scales originating on midside at point varying from mid-abdomen to vertical above anterior part of anal fin, extending on to middle part of caudal-fin base; additional

1-3 centrally pitted scales present above and below pitted scale(s) on middle part of caudal-fin base; scales present on cheeks (extending posteriorly over dorsal part of preopercle) and operculum; predorsal scales extending to supratemporal commissure (Fig. 1B); vertebrae 10 + 17; epurals 3; epineurals present on vertebrae 1 through 14-17 (15); ribs present on vertebrae 3 through 10, the final rib relatively long.

Upper jaw with 2-5 pairs of curved, enlarged caniniform teeth anteriorly, the medial pair smallest, and 3-5 (at symphysis) to 1-2 (on sides of jaw) irregular inner rows of small conical teeth, the teeth of outer row of conical teeth largest; lower jaw with 2-5 pairs of curved, enlarged caniniform teeth, the medial pair smallest, and 2-4 (at symphysis) to 1 (on sides of jaw) irregular inner rows of small conical teeth, the conical teeth gradually increasing in size and becoming more curved on middle part of jaw, then becoming abruptly smaller on rear part of jaw; vomer with 1-2 irregular rows of small, stout conical teeth arranged in a chevron; palatines with 1-2 irregular rows of small conical teeth; tongue pointed, without teeth.

Live coloration (based on colour transparencies of 2 paratypes; Pls 1F, 2A): head and body dark olive to dark grey-brown, becoming brownish orange to bright yellow on breast, snout and lower part of head; posterior rim of orbit dusky brown to dark grey; iris bright yellow to bright red; sides of body with scattered, small brownish red spots; flanks and rear of body with dusky brown to grey markings following myomere positions; dorsal and anal fins either olive to orange-brown basally and pinkish hyaline distally, or bright yellow; caudal fin pale olive to olive basally, becoming pinkish hyaline to yellowish olive posteriorly; pectoral fins pinkish hyaline; pelvic fins pinkish to yellowish hyaline.

Preserved coloration: head and body dark reddish brown to brown, paler on snout and ventrally on abdomen and head; posterior part of orbital rim usually dusky brown; flanks usually with dusky grey to brown barring following myomeres; brownish red spots on sides of body sometimes remain, becoming pale brown; dorsal and anal fins pale brown to hyaline or dusky brown, sometimes darker basally; caudal fin greyish brown basally, pale brown posteriorly, dorsally and ventrally; pectoral fins hyaline; pelvic fins pale brown to hyaline.

HABITAT AND DISTRIBUTION: This species is known only from the Chagos Archipelago (Fig. 5). Winterbottom et al. (1989: 28) recorded it (misidentified as *C. inornatus*) from lagoon, drop-off, reef-top, reef-flat and intertidal reefs in 0-40 m. However, they noted that the species was most abundant in lagoons and dropoffs in 6-25 m, with such habitats accounting for 87% of 635 specimens collected.

COMPARISONS: *Chlidichthys chagosensis* has previously been confused with *C. inornatus* from Sri Lanka and the Maldive Ids. It resembles that species, *C. cacatuoides* from southern Oman and Socotra, and *C. rubiceps* from the Red Sea in having the predorsal scales extend forward only to the supratemporal commissure (versus to the interorbital commissure in other congeners). Characters distinguishing the 4 species are discussed under Comparisons for *C. cacatuoides*.

REMARKS: *Chlidichthys chagosensis* is a relatively small species; the largest specimen examined is 31.3 mm SL. It has not previously been illustrated in colour; however, Winterbottom et al. (1989) provided a black and white photograph of a paratype (reproduced in colour here as Pl. 2A).

ETYMOLOGY: The specific epithet refers to the known distribution of the species.

MATERIAL EXAMINED: See above. Additional non-type material examined for condition of infraorbital canals: CHAGOS ARCHIPELAGO: ROM 46323, 45: 11.3-30.4 mm SL, Salomon Atoll, 0.75 km NE of jetty on Isle Boddham, lagoon, 9-13 m, R. Winterbottom & A. Emery, 3 March 1979.

Chlidichthys clibanarius new species
Chainmail Dottyback
Fig. 4; Pl. 2B

Chlidichthys sp. 1: Gill & Edwards, 1999: 144 (osteological material examined list).

HOLOTYPE: AMS I.28113-063, 37.3 mm SL, Madagascar, Nosy Bé, Andilana Beach (14°43'S 50°57'E), 100 m W of hotel, 50 m offshore, 0.3-2.5 m, J.R. Paxton, B.B. Collette & D. Cohen, 9 November 1988.

PARATYPES: ANSP 158208, 1: 35.3 mm SL, Aldabra Id, reef at edge of channel to lagoon at SE end of West Id (Ile Picard), 09°22'50"S 046°14'53"E, 0-4.5 m, International Indian Ocean Expedition, Anton Bruun Cruise 9, Station HA-17, 4 December 1964; BMNH 2001.5.2.1-3, 3: 28.4-34.2 mm SL, Comoro Ids, Mayotte, N side of Isle Malandzamiayatsini, 12°40'23"S 045°04'28"E, caves at base of 12 m drop-off and coral-covered wall above and sand and patch reef below, 6-18 m, R. Winterbottom et al., 15 November 1988; ROM 72494, 2: 39.4-40.8 mm SL, Comoro Ids, Mayotte, Pomanji Id, off N end of airport runway (12°48'12"S 045°16'18"E), *Porites* bommie, calcrete rock, silt and sand, 0.5-5 m, R. Winterbottom et al., 12 November 1988; ROM 72945, 1: 24.1 mm SL, Comoro Ids, Mayotte, patch reef just W of sand bank on Recif Du Sable Blanc (12°58'52"S 045°12'45"E), coral bommie on sand and coral rubble, 3-6 m, R. Winterbottom et al., 14 November 1988; ROM 72946, 4: 31.6-39.5 mm SL, collected with BMNH 2001.5.2.1-3; ROM 1735CS, 2: 33.5-38.1 mm SL (subsequently cleared and stained), collected with BMNH 2001.5.2.1-3; ROM 72508, 1: 38.3 mm SL, Comoro Ids, Anjouan, 2 nautical miles N of Hajoho on N part of E side of island (12°05'12"S 044°29'20"E), bommie rising 4.5 m from sand and rubble bottom with *Porites*, *Acropora*, sponges and anemones,

11-15 m, R. Winterbottom et al., 20 November 1988; RUSI 30717, 12: 26.8-42.0 mm SL, Comoro Ids, Moheli, Ile Ove ne Ou, P.C. Heemstra, 21 October 1986; RUSI 34627, 2: 28.6-34.2 mm SL, collected with RUSI 30717; RUSI 52883, 2: 32.5-40.0 mm SL, Madagascar, Ambariotelo Islets (13°26'S 048°22'E), sand, rock and coral bottom, 10-15 m, P.C. Heemstra & D. Hensley, 9 September 1995; RUSI 52936, 8: 25.8-39.8 mm SL, Madagascar, SW coast of Nosy Bé, Antsamantsara (13°23'S, 048°12'E), P.C. Heemstra & D. Hensley, 7 September 1995; USNM 264216, 1: 40.0 mm SL, Aldabra Id, lagoon, patch reef opposite Grande Passe, 3 m, B. Kensley & P.A. Hutchings, 16 April 1983.

DIAGNOSIS: A species of *Chlidichthys* with the following combination of characters: dorsal-fin rays II,22-24, usually II,23; anal-fin rays III,13-14, usually III,14; pectoral-fin rays 16-18, usually 17-18; predorsal scales 12-17, extending to interorbital commissure; ctenoid scales beginning at 1-3 transverse scale rows behind gill opening; and circumpeduncle scales 20-23, usually 20. It also has distinctive live and preserved coloration: head and body pale brown to brown (in life, pale green to olive or bright green, with yellow to bright orange or bright red stripes on head and front of body, and snout and anteroventral part of head reddish grey to bright red), with bases of scales edged with dark brown (dark olive-grey in life), giving reticulate pattern; dorsal and anal fins dark brown to dark grey basally (bluish grey to olive in life), greyish to brownish hyaline distally; scaly sheath of caudal fin similar to body coloration, edged posteriorly with dark brown to grey (olive-grey in life), remainder of fin greyish to brownish hyaline.

DESCRIPTION (based on 40 specimens, 24.1-42.0 mm SL): Dorsal-fin rays II,22-24 (II,23), last 5-8 (7) rays branched; anal-fin rays III,13-14 (III,14), last 3-7 (6) rays branched; pectoral-fin rays 16-18 (17/18), upper 2-5 (?/4) and lower 2-4 (3/3) rays unbranched; pelvic-fin rays I,4, all rays unbranched; principal caudal-fin rays 9 + 8, the uppermost 1-3 (2) and lowermost 1-2 (2) rays unbranched; upper procurrent caudal-fin rays 4-6 (6); lower procurrent caudal-fin rays 4-6 (5); total caudal-fin rays 25-28 (28); lateral scale series 43-49 (47/44); predorsal scales 12-17 (14); transverse scale series 18-21 (19/19); scales behind eye 2-3 (2); scales to preopercle angle 3-4 (3); circumpeduncle scales 20-23 (20); ctenoid scales beginning at 1-3 (?/2) transverse scale rows behind gill opening; gill-rakers 4-6 + 10-13 = 15-19 (5 + 12); pseudobranch filaments 7-10 (9).

Head pores (all bilaterally paired except posterior interorbital pores): nasal pores 2; anterior interorbital pores 1; posterior interorbital pores 0; supraotic pores 2; suborbital pores 7-8 (8/8); posterior otic pores 0; preopercle pores 6-7 (6/6); dentary pores 3-4 (4/4); intertemporal pores 0-1 (1/1); anterior temporal pores 0; posttemporal pores 1; parietal pores 2.

As percentage of standard length (based on 21 specimens, 26.8-40.8 mm SL): body depth at dorsal-fin origin 21.8-25.2 (23.1); greatest body depth 23.3-27.2 (24.7); body width 10.9-12.2 (11.5); head length 27.4-30.6 (28.7); snout 5.2-5.8 (5.6); orbit diameter 9.3-11.3 (9.7); interorbital width 2.9-3.7 (3.5); upper jaw 9.6-10.4 (10.2); caudal peduncle depth 12.6-14.7 (13.4); caudal peduncle length 11.0-12.3 (11.3); predorsal 30.4-33.5 (31.4); preanal 55.4-60.1 (59.8); prepelvic 27.4-31.6 (31.6); first segmented dorsal-fin ray 10.0-24.2 (11.3); third from last segmented dorsal-fin ray 13.6-16.0 (14.5); dorsal-fin base 59.2-65.2 (60.6); first segmented anal-fin ray 8.6-11.3 (9.9); third from last segmented anal-fin ray 12.7-15.2 (13.1); anal-fin base 29.2-31.3 (30.8); caudal fin 20.4-23.0 (20.4); pectoral fin 17.3-20.6 (18.2); pelvic fin 17.9-25.0 (22.5).

Lower lip incomplete; sensory canal of infraorbital 1 not continuous with sensory canal of infraorbital 3; fin spines weak and flexible; anterior dorsal-fin pterygiophore formula S/S/3/1 + 1 or S/S/3/1/1 + 1 (S/S/3/1 + 1); 14-16 (15) consecutive dorsal-fin pterygiophores inserting in 1:1 relationship directly behind neural spine 4; anterior anal-fin pterygiophore formula 3/1 + 1 or /3 + 1 + 1 (3/1 + 1); 6-7 (7) consecutive anal-fin pterygiophores inserting in 1:1 relationship directly behind haemal spine 2; second segmented pelvic-fin ray longest; caudal fin rounded to truncate or weakly emarginate; dorsal and anal fins without distinct scaly sheath, although some fish with a few scales overlapping fin bases; anterior lateral line represented by single tubed scale at gill opening, followed by intermittent series of centrally pitted scales, which terminate beneath segmented dorsal-fin ray 15 to about 4 scales behind dorsal-fin termination (terminate beneath segmented dorsal-fin ray 19/21 in holotype); second intermittent series of centrally pitted scales originating on midside above point ranging from middle of abdomen to above anterior part of anal fin, extending on to middle of caudal-fin base; additional 1-3 centrally pitted scales present above and below pitted scale(s) on middle part of caudal-fin base; scales present on cheeks (extending posteriorly over dorsal part of preopercle) and operculum; predorsal scales extending to interorbital commissure (at point ranging from vertical through midpoint between anterior supraotic pores and anterior interorbital pores, to anterior interorbital pores); vertebrae 10 + 17; epurals 3; epineurals present on vertebrae 1 through 14-17 (1 through 15); ribs present on vertebrae 3 through 10, the final rib relatively long.

Upper jaw with 2-6 pairs of curved, enlarged caniniform teeth anteriorly, the medial pair smallest, and 4-6 (at symphysis) to 1-2 (on sides of jaw) irregular inner rows of small conical teeth, the teeth on outer row of conical teeth largest; lower jaw with 2-5 pairs of curved, enlarged caniniform teeth, the medial pair smallest, and 4-5 (at symphysis) to 1 (on sides of jaw) irregular inner rows of small conical teeth, the conical teeth gradually increasing in size and becoming more curved and caniniform on middle part of jaw, then becoming abruptly smaller on rear part of jaw; vomer with 1-2 rows of small conical teeth arranged in a chevron; palatines with 1-2 irregular rows of small conical teeth in an elongate patch; tongue pointed, without teeth.

Live coloration (based on colour transparencies of

paratypes from the Comoro Ids; Pl. 2B): head and body pale green or pale olive to bright green; bases of scales edged narrowly to broadly with dark olive-grey, giving, in combination with pale background, pronounced reticulate pattern; reticulate pattern most obvious dorsally and posteriorly, weakly developed or absent on lower part of head and abdomen; yellow to bright orange or bright red median stripe from interorbital area to origin of dorsal fin; second bright orange to bright red stripe from posterodorsal part of orbital rim along dorsal part of head, becoming diffuse posteriorly and ending beneath anterior part of dorsal fin; third, less distinct, yellow to bright orange stripe extending in arc from beneath eye to posterodorsal part of opercle, sometimes extending to above pectoral-fin base; yellow to bright orange large spot sometimes present on subopercle and on pectoral base, these sometimes united to form short stripe; posterior rim of orbit bluish to greenish grey; snout and lower part of head anterior to vertical through middle of eye abruptly reddish grey to bright red; iris bright orange to bright red, sometimes with posterior or ventral part golden yellow; dorsal and anal fins bluish grey to olive, greyish hyaline distally, with pink to olive or red rays; caudal fin with reticulate pattern from body extending on to scaly sheath, the remainder of fin olive to grey, becoming hyaline posteriorly; caudal-fin rays grey to olive, becoming red posteriorly; pectoral fins red to olive basally, becoming pinkish to reddish hyaline distally; pelvic fins pinkish to greenish hyaline.

Preserved coloration: pattern generally similar to live coloration, head and body becoming brown to pale brown, paler on snout and ventral part of head, with dark basal edging on scales dark greyish brown to dark brown; yellow to bright orange or bright red stripes and spots on head and anterior part of body usually disappear, sometimes become pale brown although barely discernable; dorsal and anal fins greyish to brownish hyaline, usually dark brown to dark grey basally; caudal fin scaly sheath similar to body coloration, edged posteriorly in dusky brown to dark grey, becoming greyish to brownish hyaline on dorsal, ventral and posterior part of fin; pectoral and pelvic fins pale brown to hyaline.

HABITAT AND DISTRIBUTION: *Chlidichthys clibanarius* is known only from the Comoro Ids, Aldabra and northern Madagascar (Fig. 4). It has been collected from patch reefs, bommies and caves in drop-offs in 0.3-18 m.

COMPARISONS: This species resembles *C. auratus* from the Red Sea, *C. bibulus* from Socotra, east Africa and Aldabra, and *C. johnvoelckeri* from east Africa and the Comoro Ids in most meristic and morphometric values. Characters distinguishing the 4 species are discussed under Comparisons for *C. auratus*.

REMARKS: *Chlidichthys clibanarius* is a moderate-sized species; the largest specimen examined is 42.0 mm SL. It has been collected in rotenone stations with *C. pembae* and *C. johnvoelckeri*.

ETYMOLOGY: The specific epithet is from the Latin, meaning a soldier clad in mail, and alludes to the armour-like appearance of the body, owing to the presence of dark scale edging.

MATERIAL EXAMINED: See above type material.

***Chlidichthys foudioides* new species**
Fody Dottyback
Fig. 3; Pls 2C-D

HOLOTYPE: RUSI 67438, 35.3 mm SL, Rodrigues, Baladirou (19°39'43"S 63°27'27"E), coral and sand, 20 m, P.C. Heemstra et al., 16 October 2001.

PARATYPES: AMS I.43170-001, 1: 29.2 mm SL, collected with holotype; ASU 18578, 1: 33.0 mm SL (subsequently cleared and stained), collected with holotype; BMNH 2003.6.26.1, 1: 28.5 mm SL, collected with holotype; ROM 73620, 1: 30.5 mm SL, collected with holotype; RUSI 67432, 4: 28.3-39.8 mm SL, Grand Baie (19°39'47"E 63°26'23"E), coral and sand, 18 m, P.C. Heemstra et al., 24 September 2001; RUSI 67440, 6: 23.9-40.0 mm SL, Rodrigues, Passe Grenade off Riviere Banane (19°40'27"S 63°29'18"E), coral and sand, P.C. Heemstra et al., 17 October 2001; RUSI 67442, 9: 25.4-32.2 mm SL, Rodrigues, Eric's Plate (19°39'05"S 63°25'46"E), coral, 18 m, P.C. Heemstra et al., 20 October 2001; RUSI 69151, 4: 25.9-36.7 mm SL, collected with holotype; USNM 372275, 1: 28.0 mm SL, collected with holotype.

DIAGNOSIS: A species of *Chlidichthys* with the following combination of characters: dorsal-fin rays usually II,22; anal-fin rays usually III,13; predorsal scales extending to point ranging from vertical through anterior supraotic pores to just short of anterior interorbital pores; lateral scale series 44-50; ctenoid scales beginning at 2-5 transverse scale rows behind gill opening; and caudal-fin length 21.0-23.8 % SL.

DESCRIPTION (based on 29 specimens, 23.9-40.0 mm SL): Dorsal-fin rays II,22-23 (II,22), last 5-7 (6) rays branched; anal-fin rays II-III,12-14 (III,13), last 4-6 (5) rays branched; pectoral-fin rays 17-19 (18/17), upper 3-5 (3/3) and lower 3-5 (4/3) rays unbranched; pelvic-fin rays I,4, all rays unbranched; principal caudal-fin rays 9 + 8, the uppermost 1-2 (2) and lowermost 1-2 (2) unbranched; upper procurrent caudal-fin rays 5; lower procurrent caudal-fin rays 4-5 (4); total caudal-fin rays 26-27 (26); lateral scale series 44-50 (47/46); predorsal scales 12-17 (14); transverse scale series 17-21 (19/18); scales behind eye 2-3 (2); scales to preopercle angle 3-4 (4); circumpeduncle scales 19-20 (20); ctenoid scales beginning at 2-5 (3/3) transverse scale rows behind gill opening; gill-rakers 4-6 + 12-13 = 16-18 (4 + 12); pseudobranch filaments 7-8 (8).

Head pores (all bilaterally paired except posterior interorbital pores): nasal pores 2-3 (2/2); anterior interorbital pores 1; posterior interorbital pores 0-1 (0);

supraotic pores 2; suborbital pores 7; posterior otic pores 0; preopercle pores 6-7 (6/6); dentary pores 4; intertemporal pores 1; anterior temporal pores 0-1 (0/0); posttemporal pores 1; parietal pores 2.

As percentage of standard length (based on 24 specimens, 23.9-39.8 mm SL): body depth at dorsal-fin origin 22.1-26.2 (23.2); greatest body depth 23.6-28.2 (25.2); body width 10.5-12.2 (10.5); head length 29.6-32.6 (30.3); snout 5.4-6.3 (6.2); orbit diameter 9.9-11.8 (9.9); interorbital width 3.1-3.8 (3.7); upper jaw 10.2-11.2 (10.5); caudal peduncle depth 12.5-14.4 (12.7); caudal peduncle length 11.9-13.6 (12.7); predorsal 31.4-35.6 (32.9); preanal 55.8-62.6 (58.9); prepelvic 28.1-31.9 (29.5); first segmented dorsal-fin ray 10.9-13.2 (broken in holotype); third from last segmented dorsal-fin ray 13.8-15.8 (14.2); dorsal-fin base 55.5-61.5 (58.3); first segmented anal-fin ray 9.8-11.3 (10.2); third from last segmented anal-fin ray 12.8-15.8 (14.2); anal-fin base 26.6-30.8 (27.5); caudal fin 21.0-23.8 (21.5); pectoral fin 18.5-21.1 (19.3); pelvic fin 20.5-23.9 (broken in holotype).

Lower lip incomplete; sensory canal of infraorbital 1 not continuous with sensory canal of infraorbital 3; fin spines weak and flexible; anterior dorsal-fin pterygiophore formula S/S/3/1 + 1 or S/S/S + 3/1 + 1 (S/S/3/1 + 1); 15-16 (16) consecutive dorsal-fin pterygiophores inserting in 1:1 relationship directly behind neural spine 4; anterior anal-fin pterygiophore formula 3/1 + 1, /3 + 1 + 1 or /2 + 1 (3/1 + 1); 6-8 (7) consecutive anal-fin pterygiophores inserting in 1:1 relationship directly behind haemal spine 2; second segmented pelvic-fin ray longest; caudal fin slightly rounded to truncate or slightly emarginate; dorsal and anal fins without scaly sheath, although with a few scales overlapping fin bases; anterior lateral line represented by single tubed scale at gill opening, followed by intermittent series of centrally pitted scales, which terminate beneath segmented dorsal-fin ray 17-22, or just behind termination of dorsal fin (terminate beneath segmented dorsal-fin ray 19/19 in holotype); second intermittent series of centrally pitted scales originating on midside at point ranging from posterior third of abdomen to above anal-fin origin, extending on to middle of caudal-fin base; additional 1-3 centrally pitted scales present above and below pitted scale(s) on middle part of caudal-fin base; scales present on cheeks (extending posteriorly over dorsal part of preopercle) and operculum; predorsal scales extending to interorbital commissure (at point ranging from vertical through anterior supraotic pores to just short of anterior interorbital pores); vertebrae 10 + 17-18 (10 + 17); epurals 3; epineurals present on vertebrae 1 through 14-16 (1 through 15); ribs present on vertebrae 3 through 10, the final rib relatively long.

Upper jaw with 2-5 pairs of curved, enlarged caniniform teeth anteriorly, the medial pair smallest, and 5-6 (at symphysis) to 1-2 (on sides of jaw) irregular inner rows of small conical teeth, the teeth on outer row of conical teeth largest; lower jaw with 2-5 pairs of curved, enlarged caniniform teeth, the medial pair smallest, and 3-4 (at symphysis) to 1 (on sides of jaw) irregular inner rows of small conical teeth, the conical teeth gradually increasing in size and becoming more curved and caniniform on middle part of jaw, then becoming abruptly smaller on rear part of jaw; vomer with 1 row of small conical teeth arranged in a chevron; palatines with 1-2 irregular rows of small conical teeth in a small, irregular patch; tongue pointed, without teeth.

Live coloration (based on photographs of 2 paratypes; Pls 2C-D): snout, lips and lower part of head greyish red to bright orange; remainder of head pinkish grey to olive-green ventrally and dark purplish grey to greyish mauve dorsally; bright orange to bright red stripe extending obliquely from posterodorsal rim of eye to vertical above gill opening; second, more diffuse, greyish red stripe extending from upper part of preopercle to upper posterior part of opercle; irregular spot or short stripe of similar coloration on lower third of operculum; posterior rim of orbit dusky grey, variably with mauve to pale blue cast; iris pink to lavender, grey to orange on perimeter; body dark olive-grey, becoming pinkish grey to olive green on lower abdomen and breast, with darker olive-grey barring following myomeres on flanks; dorsal fin greyish to pinkish hyaline; basal part of dorsal fin in front of sixth or seventh segmented ray pale blue, edged distally with reddish grey; remainder of dorsal-fin base dark grey; anal fin pinkish to greyish hyaline, with basal part of fin dark grey; caudal fin dark olive-grey basally on scale sheath, with remainder of fin pale yellowish hyaline, becoming greyish hyaline posteriorly; pectoral fins greyish to yellowish hyaline basally, remainder of fin pinkish hyalin; pelvic fins pinkish hyaline.

Preserved coloration: pattern generally similar to live coloration, head and body becoming brown, paler ventrally; orange and red markings on head become pale brown, although stripes usually very indistinct or absent; oribtal rim dusky grey posteriorly; dark bars on flanks remain; dorsal, anal and caudal fins dark brown to grey-brown basally, pale brown to brownish hyaline distally; pectoral and pelvic fins pale brown to hyaline.

HABITAT AND DISTRIBUTION: Known only from Rodrigues (Fig. 3). It has been collected from coral reefs in 18-20 m.

COMPARISONS: *Chlidichthys foudioides* resembles *C. abruptus* and *C. randalli* in having the following character combination: dorsal-fin rays usually II,22; anal-fin rays usually III,13; pectoral-fin rays 17-19, usually 18; predorsal scales extending to interorbital commissure (at point ranging from vertical through anterior supraotic pores to just short of anterior interorbital pores); lateral scale series 45-50; and ctenoid scales beginning at 2-5 transverse scale rows behind gill opening. Characters distinguishing the 3 species are discussed under Remarks for *C. abruptus*.

REMARKS: *Chlidichthys foudioides* is a moderate-sized species; the largest specimen examined is 40 mm SL. It is the only pseudoplesiopine species known from Rodrigues, although additional species are known from

throughout the Mascarene Islands: *C. randalli* and *C. smithae* in Mauritius, and *C. abruptus* at St Brandon's Shoals.

ETYMOLOGY: The specific epithet is for the predominantly red- or yellow-headed Mascarene weaver bird genus *Foudias* (fodies), which is found throughout western Indian Ocean islands (including Rodrigues), and the Greek stem *oides*; it alludes to the red markings on the head.

MATERIAL EXAMINED: See above type material.

Chlidichthys inornatus Lubbock
Inornate Dottyback
Fig. 5; Pl. 2E

Chlidichthys inornatus Lubbock, 1976: 169, fig. 1 (type locality, Lively Rocks, Trincomalee, Sri Lanka; holotype, BMNH 1973.12.20.247); Lubbock, 1977: 16 (in part, comparison); Randall & Anderson, 1993: 15, pl. 3c (Maldive Ids; col. fig.); Gill & Randall, 1994: 12, 15, fig. 1A (generic classification; comparison; lower lip morphology); Kuiter, 1998: 77 (colour photos; habitat; distribution in part); Gill & Edwards, 1999: 146 (list).

Pseudoplesiops inornatus: Edwards & Randall, 1983: 113 (comparison); Burgess et al., 1988: pl. 154 (colour photo).

DIAGNOSIS: A species of *Chlidichthys* with the following combination of characters: predorsal scales extending to supratemporal commissure; suborbital pores 6-7, rarely 7; sensory canal of anteriormost infraorbital bone (infraorbital 1) continuous with adjacent infraorbital (infraorbital 3); and dorsal-fin rays II,21-22, rarely II,21.

DESCRIPTION (based on 28 specimens, 12.4-36.9 mm SL): Dorsal-fin rays II,21-22 (II,22), last 1-8 (7) rays branched; anal-fin rays II-III,13-14 (II,13), last 1-7 (5) rays branched; pectoral-fin rays 16-19 (18/18), upper 2-4 (2/3) and lower 2-4 (3/3) rays unbranched; pelvic-fin rays I,4, all rays unbranched; principal caudal-fin rays 9 + 8, the uppermost 2 and lowermost 1-2 (2) rays unbranched; upper procurrent caudal-fin rays 4-6 (5); lower procurrent caudal-fin rays 4-5 (5); total caudal-fin rays 25-28 (27); lateral scale series 38-43 (41/40); predorsal scales 7-11 (10); transverse scale series 15-19 (18/17); scales behind eye 1-3 (2); scales to preopercle angle 3-4 (3); circumpeduncle scales 17-20 (20); ctenoid scales beginning at 8-15 (13/13) transverse scale rows behind gill opening; gill-rakers 3-4 + 10-12 = 13-16 (3 + 11); pseudobranch filaments 7-9 (8).

Head pores (all bilaterally paired except posterior interorbital pores): nasal pores 2; anterior interorbital pores 1; posterior interorbital pores 0; supraotic pores 2; suborbital pores 6-7 (6/6); posterior otic pores 0; preopercle pores 6-7 (6/6); dentary pores 4; intertemporal pores 1; anterior temporal pores 0; posttemporal pores 1; parietal pores 2.

As percentage of standard length (based on 19 specimens, 27.2-36.9 mm SL): body depth at dorsal-fin origin 22.4-25.6 (23.4); greatest body depth 23.1-26.9 (25.4); body width 11.1-12.3 (12.3); head length 29.0-32.5 (29.5); snout 4.8-6.5 (5.0); orbit diameter 8.4-9.9 (8.8); interorbital width 3.4-4.6 (4.1); upper jaw 10.5-11.4 (11.1); caudal peduncle depth 12.5-15.5 (15.5); caudal peduncle length 9.6-12.0 (10.5); predorsal 31.2-33.6 (31.3); preanal 56.8-64.1 (57.0); prepelvic 27.8-31.8 (27.8); first segmented dorsal-fin ray 8.6-11.8 (10.8); third from last segmented dorsal-fin ray 14.5-16.8 (16.7); dorsal-fin base 58.3-63.5 (63.5); first segmented anal-fin ray 8.7-12.7 (12.3); third from last segmented anal-fin ray 14.0-17.2 (16.1); anal-fin base 27.1-31.3 (31.3); caudal fin 22.1-25.2 (23.7); pectoral fin 17.2-20.7 (19.0); pelvic fin 19.6-25.9 (24.9).

Lower lip incomplete; sensory canal of infraorbital 1 continuous with sensory canal of infraorbital 3; fin spines weak and flexible; anterior dorsal-fin pterygiophore formula S/S/3/1 + 1; 15-16 (15) consecutive dorsal-fin pterygiophores inserting in 1:1 relationship directly behind neural spine 4; anterior anal-fin pterygiophore formula 3/1 + 1 or 2/1 + 1 (3/1 + 1); 6-7 (7) consecutive anal-fin pterygiophores inserting in 1:1 relationship directly behind haemal spine 2; second segmented pelvic-fin ray longest; caudal fin weakly rounded to truncate or slightly emarginate; dorsal and anal fins without distinct scaly sheath, although some fish with a few scales overlapping fin bases; anterior lateral line represented by single tubed scale at gill opening, followed by intermittent series of centrally pitted scales, which terminate beneath segmented dorsal-fin ray 16-22 (21/22); second intermittent series of centrally pitted scales originating on midside at point varying from mid-abdomen to vertical above anterior part of anal fin, extending on to middle part of caudal-fin base; additional 1-3 centrally pitted scales present above and below pitted scale(s) on middle part of caudal-fin base; scales present on cheeks (extending posteriorly over dorsal part of preopercle) and operculum; predorsal scales extending to supratemporal commissure; vertebrae 10 + 16-17 (10 + 17); epurals 3; epineurals present on vertebrae 1 through 15-18 (1 through 16); ribs present on vertebrae 3 through 10, the final rib relatively long.

Upper jaw with 2-6 pairs of curved, enlarged caniniform teeth anteriorly, the medial pair smallest, and 3-4 (at symphysis) to 1-2 (on sides of jaw) irregular inner rows of small conical teeth, the teeth of outer row of conical teeth largest; lower jaw with 2-6 pairs of curved, enlarged caniniform teeth, the medial pair smallest, and 2-4 (at symphysis) to 1 (on sides of jaw) irregular inner rows of small conical teeth, the conical teeth gradually increasing in size and becoming more curved on middle part of jaw, then becoming abruptly smaller on rear part of jaw; vomer with 1-2 irregular rows of small, stout conical teeth arranged in a chevron; palatines with 1-2 irregular rows of small conical teeth; tongue pointed, without teeth.

Live coloration (based on field notes and photographs taken by H.R. Lubbock of the holotype and of paratypes

and other specimens from the Maldive Ids and Sri Lanka, and on photographs of specimens from the Maldives; Pl. 2E): head and body light greenish yellow to olive-brown or purplish brown, sometimes becoming bright greenish yellow to orangish or reddish to pinkish brown on lower part of abdomen and head; posterior part of orbital rim sometimes slightly dusky; iris brown or bright greenish yellow to bright orange or red, usually narrowly white to bright yellow around pupil; sides of body sometimes indistinctly spotted with red; dorsal and anal fins olive to bright yellow or pinkish hyaline, sometimes pale blue to dark greyish blue basally; anal fin sometimes with 1-2 orange to pink stripes on distal part of fin; caudal fin olive to bright yellow, sometimes becoming hyaline distally; pectoral and pelvic fins pinkish or yellowish hyaline to hyaline.

Preserved coloration: head and body dark reddish brown to brown, paler on snout and ventrally on abdomen and head; posterior part of orbital rim usually dusky brown; flanks usually with dusky grey to brown barring following myomeres; indistinct red spots on sides of body sometimes remain, becoming pale brown; dorsal and anal fins pale brown to hyaline or dusky brown, sometimes darker basally; caudal fin greyish brown basally, pale brown posteriorly, dorsally and ventrally; pectoral fins hyaline; pelvic fins pale brown to hyaline.

HABITAT AND DISTRIBUTION: *Chlidichthys inornatus* is known only from Sri Lanka and the Maldive Ids (Fig. 5). Previous records from the Chagos Archipelago are based on *C. chagosensis*. It has been collected and observed around reefs, coral heads and rocks, often under ledges and in caves, at depths ranging from 2-35 m.

COMPARISONS: *Chlidichthys inornatus* closely resembles *C. cacatuoides* from southern Oman and Socotra, *C. chagosensis* from the Chagos Archipelago and *C. rubiceps* from the Red Sea in most characters. The 4 species differ from all other congeners in having the predorsal scales extend forward only to the supratemporal commissure (versus to the interorbital commissure). Characters distinguishing the 4 species are discussed under Comparisons for *C. cacatuoides*.

REMARKS: *Chlidichthys inornatus* is a relatively small species; the largest specimen examined is 36.9 mm SL. Colour photographs of it are provided by Burgess et al. (1988), Randall & Anderson (1993), Debelius (1993, 1996) and Kuiter (1998). Although not stated by Burgess et al. (1988), their photograph is of a paratype from Sri Lanka (AMS I.18169-001, 26.0 mm SL). Randall & Anderson (1993) indicate that their photograph is of 2 specimens in BPBM 32925, but it is actually of specimens in BPBM 32973; their photograph is reproduced here (Pl. 2E). Kuiter (1998: 77) suggested that males are more "brightly coloured" (presumably referring to greenish yellow fish) than females (presumably referring to brown fish). However, R.C. Anderson (pers. comm.) noted that greenish yellow specimens rapidly become brown after death (before preservation). Further studies are needed to verify sexual dimorphism.

ETYMOLOGY: According to Lubbock (1976: 171) the specific epithet "refers to the relative drab coloration of the species."

MATERIAL EXAMINED: MALDIVE IDS: BPBM 32941, 3: 29.5-33.0 mm SL, South Malé Atoll, N side of Embudu Id, outside reef, cave in drop-off, 35 m, J.E. Randall, R.C. Anderson, M.S. Adam, H. Shareef & H. Zahir, 18 March 1988; BPBM 32973, 10: 27.5-34.0 mm SL, South Malé Atoll, S side of Embudu Id, lagoon reef, 8-10 m, J.E. Randall, R.C. Anderson, M.S. Adam, H. Shareef & H. Zahir, 18 March 1988; BPBM 32925, 7: 26.5-33.1 mm SL, South Malé Atoll, Maaniyafushi Id, reef, 25-30 m, J.E. Randall, R.C. Anderson & M.S. Adam, 17 March 1988. SRI LANKA: BMNH 1973.12.20.247, 1: 34.2 mm SL (holotype), Trincomalee, Lively Rocks, 10 m, among coral rocks, R. Lubbock & J. Serpell, 9 July 1973; BMNH 1973.12.20.248-250, 3: 12.4-32.3 mm SL (paratypes), Trincomalee, Round Id, 20 m, in dead *Plerogyra* coral and in crack at base of rock, R. Lubbock, J. Serpell & R. Jonklaas, 8 July 1973; USNM 290329, 2: 32.4-35.2 mm SL, USNM 290651, 2: 15.6-36.9 mm SL, Trincomalee, centre of second bay N of harbour, 7.5 m, C.C. Koenig, 4 April 1970.

Chlidichthys johnvoelckeri Smith
Cerise Dottyback
Figs 1A, 2A, 6; Pl. 2F

Chlidichthys johnvoelckeri Smith, 1953: 518, pl. 107, fig. 408a (type locality, South East Africa; unspecified number of syntypes; colour illustration); Smith, 1954: 203, fig. 2 (described as new; lectotype designated); Smith, 1961: 518, pl. 107, fig. 408a (text and illustration as in Smith, 1953); Lubbock, 1977: 13, pl. 4a (description; distribution); Carcasson, 1977: 119 (compilation); Smith, 1986: 540, pl. 46, fig. 169.3 (compilation); Gill & Randall, 1994: 12 (generic classification); Gill, 1998: fig. 4 (osteological details); Gill & Edwards, 1999: figs 4, 6B, 7B, 8B, 9D, 10D, 12D, 13D and 14D (black and white photograph; anatomical details).

DIAGNOSIS: A species of *Chlidichthys* with the following combination of characters: dorsal-fin rays II;22-23, usually II,22; anal-fin rays II-III,13; high number of caudal-fin rays (upper procurrent rays 5-7, usually 6; lower procurrent rays 5-6, usually 6; total caudal-fin rays 28-30); and relatively small scales (e.g., lateral scale series 47-52; transverse scale series 18-22; circumpeduncle scales 22-25, usually 23-24). It also has distinctive live and preserved coloration: head and body pale yellow to pale brown (cerise pink to magenta in life), with scales behind pectoral base each with brown to greyish brown basal spot (purple to dark grey in life), forming weak reticulated pattern; dorsal and anal fins dusky grey to dark grey (in life, dark grey with greenish iridescence basally, followed distally by bright red or magenta, then pinkish hyaline, then bluish grey with pale pink distal

margin); caudal fin pale yellow to pale brown basally, becoming dark grey dorsally, ventrally and posteriorly (in life, scales magenta, with basal three-quarters of fin deep purplish blue, and posterior, upper and lower margins magenta).

DESCRIPTION (based on 29 specimens, 19.4-46.7 mm SL): Dorsal-fin rays II,22-23 (II,22), last 4-8 (7) rays branched; anal-fin rays II-III,13 (III,13), last 3-6 (?) rays branched; pectoral-fin rays 16-18 (17/17), upper 3-4 (3/?) and lower 2-4 (2/3) rays unbranched; pelvic-fin rays I,4, all rays unbranched; principal caudal-fin rays 9 + 8, the uppermost 1-2 (?) and lowermost 1-2 (2) rays unbranched; upper procurrent caudal-fin rays 5-7 (6); lower procurrent caudal-fin rays 5-6 (6); total caudal-fin rays 28-30 (29); lateral scale series 47-52 (50/51); predorsal scales 13-19 (17); transverse scale series 18-22 (19/20); scales behind eye 2-3 (3); scales to preopercle angle 3-4 (4); circumpeduncle scales 22-25 (24); ctenoid scales beginning at 3-8 (3/3) transverse scale rows behind gill opening; gill-rakers 4-6 + 11-13 = 16-19 (5 + 11); pseudobranch filaments 7-12 (12).

Head pores (all bilaterally paired except posterior interorbital pores; Fig. 1A): nasal pores 2-3 (2/2); anterior interorbital pores 1; posterior interorbital pores 0; supraotic pores 2; suborbital pores 6-7 (7/7); posterior otic pores 0; preopercle pores 6; dentary pores 4; intertemporal pores 1; anterior temporal pores 0; posttemporal pores 1; parietal pores 2.

As percentage of standard length (based on 18 specimens, 21.6-46.7 mm SL; lectotype too damaged to measure accurately): body depth at dorsal-fin origin 20.8-25.8; greatest body depth 21.3-27.0; body width 8.3-11.9; head length 27.1-31.4; snout 4.9-5.9; orbit diameter 7.8-11.6; interorbital width 3.2-4.7; upper jaw 9.5-11.0; caudal peduncle depth 12.7-15.4; caudal peduncle length 10.9-12.9; predorsal 28.3-33.9; preanal 57.5-61.4; prepelvic 28.0-31.0; first segmented dorsal-fin ray 8.5-10.7; third from last segmented dorsal-fin ray 14.3-17.7; dorsal-fin base 59.6-64.5; first segmented anal-fin ray 5.1-10.7; third from last segmented anal-fin ray 12.5-16.3; anal-fin base 26.8-31.9; caudal fin 21.8-24.2; pectoral fin 17.4-19.9; pelvic fin 22.5-33.2.

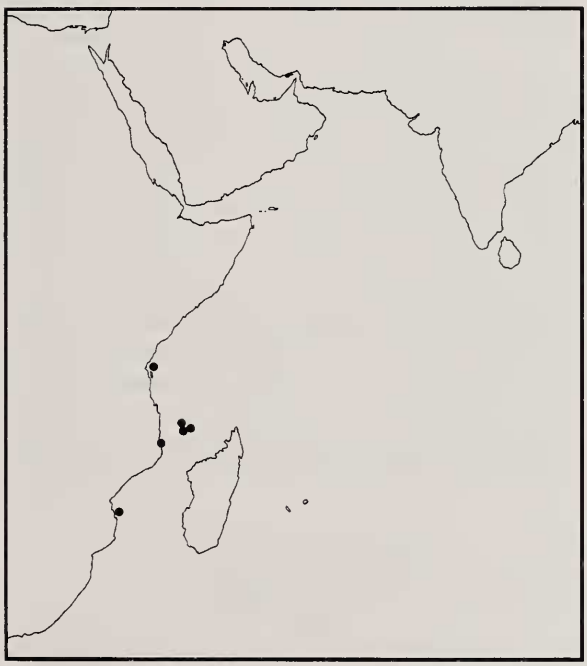

Figure 6. Distributional records for *Chlidichthys johnvoelckeri* (closed circles).

Lower lip incomplete, although symphysial interruption sometimes weak; sensory canal of infraorbital 1 not continuous with sensory canal of infraorbital 3 (Fig. 2A); fin spines weak and flexible; anterior dorsal-fin pterygiophore formula S/S/3/1 + 1; 14-16 (15) consecutive dorsal-fin pterygiophores inserting in 1:1 relationship directly behind neural spine 4; anterior anal-fin pterygiophore formula 3/1 + 1, 2/1 + 1 or /3 + 1 + 1 (3/1 + 1); 6-7 (7) consecutive anal-fin pterygiophores inserting in 1:1 relationship directly behind haemal spine 2; second segmented pelvic-fin ray longest; caudal fin rounded to weakly rounded or truncate, sometimes with lower part of fin slightly produced; dorsal and anal fins without distinct scaly sheath, although some fish with a few scales overlapping fin bases; anterior lateral line represented by single tubed scale at gill opening, followed by intermittent series of centrally pitted scales, which terminate beneath segmented dorsal-fin ray 17-22 (?/20); second intermittent series of centrally pitted scales originating on midside at point varying from mid-abdomen to vertical above anterior part of anal fin, extending on to middle part of caudal-fin base; additional 1-3 centrally pitted scales present above and below pitted scale(s) on middle part of caudal-fin base; scales present on cheeks (extending posteriorly over dorsal part of preopercle) and operculum; predorsal scales extending to interorbital commissure (at point ranging from vertical through anterior supraotic pores to anterior interorbital pores; Fig. 1A); vertebrae 10 + 17; epurals 3; epineurals present on vertebrae 1 through 14-16 (1 through 15); ribs present on vertebrae 3 through 10, the final rib relatively long.

Upper jaw with 2-6 pairs of curved, enlarged caniniform teeth anteriorly, the medial pair smallest, and 4-6 (at symphysis) to 1-3 (on sides of jaw) irregular inner rows of small conical teeth, the teeth on outer row of conical teeth largest; lower jaw with 2-5 pairs of curved, enlarged caniniform teeth, the medial pair smallest, and 3-5 (at symphysis) to 1 (on sides of jaw) irregular inner rows of small conical teeth, the conical teeth gradually increasing in size and becoming more curved and caniniform on middle part of jaw, then becoming abruptly smaller on rear part of jaw; vomer with 1-2 rows of small conical teeth arranged in a chevron; palatines with 1-3 irregular rows of small conical teeth in an elongate patch; tongue pointed, without teeth.

Live coloration (based on description in Smith, 1954, published paintings of the lectotype, and colour photographs of specimens from the Comoro Ids; Pl. 2F): head and body cerise pink to magenta; iris either bright green or magenta to deep purple on edges and bluish

grey centrally, the magenta and grey areas separated by narrow greyish yellow to bright yellow ring; pupil surrounded by narrow magenta to pink ring; scales of body behind pectoral-fin base each with bright purple to dark grey basal spot, the spots of adjacent scales aligning to form weak reticulations; dorsal- and anal-fin rays pale orange or similar to adjacent membrane; membranes of dorsal and anal fins either broadly (anteriorly) to narrowly (posteriorly) dark grey with green iridescence and distal part of fins bright red, or magenta on basal third, becoming pinkish hyaline on middle third, the outer third bluish grey with narrow pale pink distal margin; caudal fin with magenta rays and basal three-quarters of fin deep purplish blue; posterior quarter of caudal fin dark pinkish grey, this edged distally with narrow (posteriorly) to broad (dorsally and ventrally) magenta margin; scales on basal half of caudal fin magenta; posterodorsal and posteroventral tips of caudal fin orangish hyaline; pectoral and pelvic fins pinkish to orangish hyaline.

Preserved coloration: pattern generally similar to live coloration, head and body becoming pale yellow to pale brown, sometimes darker posteriorly; reticulate markings on body remain, becoming brown to greyish brown; small specimens often with dusky brown markings following myomere positions; dorsal and anal fins dusky grey to dark grey, contrasting with pale body coloration; caudal fin pale yellow to pale brown basally, dorsally and ventrally, becoming dark grey posteriorly; pectoral fins hyaline to pale brown; pelvic fins hyaline to dusky hyaline or pale brown.

HABITAT AND DISTRIBUTION: *Chlidichthys johnvoelckeri* is known only from the Comoro Ids and from Pemba Id, Tanzania, to Bazaruto Id, Mozambique (Fig. 6). Abel (1960) recorded the species from the Red Sea, which in turn formed the basis of records by Dor (1983) and Goren & Dor (1994). However, Abel's record is almost certainly based on the pseudochromine *Pseudochromis fridmani* Klausewitz, a common Red Sea species that bears a striking resemblance in body shape and coloration to *C. johnvoelckeri*. *Chlidichthys johnvoelckeri* has been collected from reefs in 6-75 m.

COMPARISONS: This species resembles *C. auratus*, *C. bibulus* and *C. clibanarius* in most meristic and morphometric values. Characters distinguishing the 4 species are discussed under Comparisons for *C. auratus*.

REMARKS: *Chlidichthys johnvoelckeri* is a relatively large species; the largest specimen examined is 46.7 mm SL. A colour illustration by M.M. Smith of the lectotype (see below) of the species is provided in Smith (1953) (reproduced in, for example, Lubbock, 1977, and Smith, 1986).

Smith (1953) described *C. johnvoelckeri* as a new genus and species without designating a holotype. However, he clearly indicated that he had at least 2 specimens (and thus a syntypic series), stating that it had been "twice found inside the mouth of No. 420 [*Cephalopholis rogaa* (Forsskål) = *Aethaloperca rogaa*], when bought up from deep reefs by bombing" (p. 518). The following year, he described the species and genus a second time as new on the basis of 3 specimens (one from Pemba Id, one from Pinda and one from Bazaruto Id), one of which (from Pemba Id; = RUSI 163) he designated as "type." We interpret this action as lectotype designation, in accordance with Article 74.5 of the International Code of Zoological Nomenclature (International Commission on Zoological Nomenclature, 1999). This specimen has been incorrectly listed elsewhere (e.g., Lubbock, 1977; Eschmeyer et al., 1998) as holotype of the species. Smith's (1954) Bazaruto Id specimen (possible paralectotype) of *C. johnvoelckeri* is apparently lost (Lubbock, 1977: 14).

Chlidichthys johnvoelckeri has been collected in rotenone stations with *C. clibanarius* and *C. pembae*.

ETYMOLOGY: According to Smith (1954: 205), it is named "for Mr. John Voelcker of Johannesburg, who has greatly assisted my work."

MATERIAL EXAMINED: COMORO IDS: CAS 25451, 18: 19.4-46.7 mm SL (2: 37.9-42.7 mm SL cleared and stained), Grande Comore, N of Hotel Itsandra, 20-30 m, J.E. McCosker et al., 19 February 1975; ROM 72509, 1: 37.7 mm SL, Moheli, N face of Ouenefou, slightly E of N tip (12°23'07"S 043°42'28"E), pinnacle at edge of fringing reef, vertical drop from 6-21 m and adjoining sand slope, numerous deep caves, 15-27 m, R. Winterbottom et al., 23 November 1988; ROM 72497, 1: 32.2 mm SL, Anjouan, 2 nautical miles N of Hajoho on N part of E side of island (12°05'12"S 044°29'20"E), bommie rising 4.5 m from sand and rubble bottom with *Porites*, *Acropora*, sponges and anemones, 11-15 m, R. Winterbottom et al., 20 November 1988; ROM 72498, 1: 36.0 mm SL, Anjouan, off Al Almal Hotel just E of Matsumudu near Missiri (12°09'30'S 044°24'00"E), hard and soft coral, anemones and sponges on sand and rubble, 6-18 m, R. Winterbottom et al., 9 November 1988; BMNH 2001.5.2.4-6, 3: 35.2-40.5 mm SL, ROM 72499, 2: 12.5-42.2 mm SL (12.5 mm SL specimen not examined in detail), ROM 1736CS, 2: 36.2-38.7 mm SL (subsequently cleared and stained), Anjouan, Point Chongochahari, headland NE of village of M'Jamaoue (12°11'09"S 04°19'03"E), *Acropora*, sea whips and sponges on sand and coral rubble, 9-21 m, R. Winterbottom, 21 November 1988. TANZANIA: RUSI 797, 1: 37.1 mm SL (paralectotype), Pemba Id, from mouth of bombed *Aethaloperca rogaa*, coral, approximately 50-75 m, J.L.B. & M.M. Smith, 28 November 1952. MOZAMBIQUE: RUSI 163, 1: 32.5 mm SL (lectotype), Pinda Id, Bocage, from mouth of bombed *Aethaloperca rogaa*, coral, approximately 50-75 m, J.L.B. & M.M. Smith, 1950.

Chlidichthys pembae Smith
Pemba Dottyback
Figs 5; Pls 3A-B

Chlidichthys pembae Smith, 1954: 200, fig. 1 (type locality, Pemba Id, Tanzania; holotype, RUSI 142); Lubbock,

1976: 171 (comparison); Lubbock, 1977: 17, pl. 2e (description); Gill & Randall, 1994: 12 (generic classification); Heemstra, 1995: x (description; distribution); Gill & Edwards, 1999: 147 (list).

Pseudoplesiops pembae: Edwards & Randall, 1983: 113 (comparison).

DIAGNOSIS: A species of *Chlidichthys* with the following combination of characters: dorsal-fin rays II,22-23, usually II,22; anal-fin rays II-III, 12-13, usually II,13; pectoral-fin rays 15-18, usually 17; lateral scale series 37-42, usually 38-41; predorsal scales extending to interorbital commissure; and ctenoid scales beginning at 7-14 transverse scale rows behind gill opening.

DESCRIPTION (based on 42 specimens, 12.5-34.0 mm SL): Dorsal-fin rays II,22-23 (II,22), last 4-7 (?) rays branched; anal-fin rays II-III,12-13 (II,13), last 3-6 (?) rays branched; pectoral-fin rays 15-18 (17/17), upper 2-5 (?/3) and lower 2-6 (2/2) rays unbranched; pelvic-fin rays I,4, all rays unbranched; principal caudal-fin rays 9 + 8, the uppermost 2-3 (2) and lowermost 2 (?) rays unbranched; upper procurrent caudal-fin rays 4-6 (5); lower procurrent caudal-fin rays 4-5 (5); total caudal-fin rays 26-28 (27); lateral scale series 37-42 (41/42); predorsal scales 9-13 (11); transverse scale series 15-17 (16/16); scales behind eye 1-3 (2); scales to preopercle angle 3-4 (3); circumpeduncle scales 18-20 (20); ctenoid scales beginning at 7-14 (11/12) transverse scale rows behind gill opening; gill-rakers 3 + 9-12 (3 + 9); pseudobranch filaments 5-7 (7).

Head pores (all bilaterally paired except posterior interorbital pores): nasal pores 2; anterior interorbital pores 1; posterior interorbital pores 0; supraotic pores 2; suborbital pores 7; posterior otic pores 0; preopercle pores 6; dentary pores 3-4 (4/4); intertemporal pores 0-1 (1/1); anterior temporal pores 0; posttemporal pores 1; parietal pores 2-3 (2/2).

As percentage of standard length (based on 24 specimens, 20.5-33.7 mm SL): body depth at dorsal-fin origin 23.2-26.3 (23.2); greatest body depth 23.2-28.3 (23.2); body width 10.6-13.7 (12.6); head length 29.0-33.5 (30.1); snout 4.8-5.7 (5.6); orbit diameter 8.9-10.7 (8.9); interorbital width 3.2-4.2 (4.0); upper jaw 10.0-11.8 (11.3); caudal peduncle depth 13.7-17.1 (15.2); caudal peduncle length 9.3-11.8 (10.9); predorsal 30.8-35.3 (32.1); preanal 59.6-66.5 (65.6); prepelvic 27.8-31.3 (31.1); first segmented dorsal-fin ray 9.1-11.6 (broken in holotype); third from last segmented dorsal-fin ray 14.8-17.4 (16.9); dorsal-fin base 56.7-62.3 (57.0); first segmented anal-fin ray 10.6-12.1 (broken in holotype); third from last segmented anal-fin ray 14.3-16.4 (15.9); anal-fin base 25.6-30.8 (27.5); caudal fin 21.9-24.6 (broken in holotype); pectoral fin 17.9-21.2 (19.5); pelvic fin 24.0-34.5 (28.1).

Lower lip incomplete; sensory canal of infraorbital 1 not continuous with sensory canal of infraorbital 3; fin spines weak and flexible; anterior dorsal-fin pterygiophore formula S/S/3/1 + 1, S/S/3/1 or S/S/3 + 1/1 (S/S/3/1 + 1); 15-16 (15) consecutive dorsal-fin pterygiophores inserting in 1:1 relationship directly behind neural spine 4; anterior anal-fin pterygiophore formula 3/1 + 1, 2/1 + 1, 2 + 1/1 or /2 + 1 + 1 (2/1 + 1); 4-7 (7) consecutive anal-fin pterygiophores inserting in 1:1 relationship directly behind haemal spine 2; second segmented pelvic-fin ray longest; caudal fin weakly rounded to truncate or emarginate; dorsal and anal fins without distinct scaly sheath, although some fish with a few scales overlapping fin bases; anterior lateral line represented by single tubed scale at gill opening, followed by intermittent series of centrally pitted scales, which terminate beneath segmented dorsal-fin ray 17-22 (21/21); second intermittent series of centrally pitted scales originating on midside at point varying from mid-abdomen to vertical above anterior part of anal fin, extending on to middle part of caudal-fin base; additional 1-3 centrally pitted scales present above and below pitted scale(s) on middle part of caudal-fin base; scales present on cheeks (extending posteriorly over dorsal part of preopercle) and operculum; predorsal scales extending to interorbital commissure (at point ranging from vertical between anterior and posterior supraotic pores to just anterior to vertical through anterior supraotic pores); vertebrae 10 + 17; epurals 3; epineurals present on vertebrae 1 through 14-17 (1 through 16); ribs present on vertebrae 3 through 10, the final rib relatively long.

Upper jaw with 2-5 pairs of curved, enlarged caniniform teeth anteriorly, the medial pair smallest, and 3-5 (at symphysis) to 1-2 (on sides of jaw) irregular inner rows of small conical teeth, the teeth of outer row of conical teeth largest; lower jaw with 2-4 pairs of curved, enlarged caniniform teeth, the medial pair smallest, and 2-4 (at symphysis) to 1 (on sides of jaw) irregular inner rows of small conical teeth, the conical teeth gradually increasing in size and becoming more curved on middle part of jaw, then becoming abruptly smaller on rear part of jaw; vomer with 1-2 irregular rows of small, stout conical teeth arranged in a chevron; palatines with 1-3 irregular rows of small conical teeth; tongue pointed, without teeth.

Live coloration (based on colour transparencies of specimens from the Comoro Ids; Pls 3A-B): head and body yellowish green to dark reddish brown, becoming orange to yellowish brown or bright yellow on lower part of head; posterior rim of orbit sometimes narrowly dark grey; iris red to bright yellow; dorsal and anal fins varying from brownish hyaline with basal third pale blue, to uniformly brownish hyaline, bright yellow or dark reddish brown; caudal fin yellowish olive to dark reddish brown basally, remainder of fin brownish hyaline to bright yellow; pectoral fins pinkish to yellowish hyaline; pelvic fins pinkish hyaline to bright yellow.

Preserved coloration: pattern generally similar to live coloration, head and body becoming pale brown to brown, paler ventrally; dark mark on orbital rim remains, becoming dark greyish brown; dusky brown markings following myomere positions often present on sides, particularly above anal fin; dorsal and anal fins pale brown to dark brown or hyaline, often with basal part of fin abruptly dark grey-brown or pale brown, contrasting

with distal part of fin; caudal fin brown to dark brown basally, remainder of fin pale brown to hyaline; pectoral and pelvic fins pale brown to hyaline.

HABITAT AND DISTRIBUTION: *Chlidichthys pembae* is known only from the east coast of Africa, from Pemba Id, Tanzania, south to Aliwal Shoal, South Africa, and the Comoro Ids (Fig. 5). It has been collected from reefs at depths ranging from 3-27 m.

COMPARISONS: *Chlidichthys pembae* closely resembles *C. smithae* from Mauritius in meristic, morphometric and coloration details. The 2 species are differentiated from all other congeners by the following character combination: dorsal-fin rays usually II,22; usually 13 segmented anal-fin rays; pectoral-fin rays usually 17; predorsal scales extending to interorbital commissure; and ctenoid scales beginning at 7-14 transverse scale rows behind gill opening. They are difficult to separate. Lubbock (1977) distinguished them on the basis of: total numbers of outer first-arch gill-rakers (12-14 in *C. pembae* versus 15 in *C. smithae*); lateral scale series (36-40 versus 40-43); orbit diameter (8.2-9.0 % SL versus 7.1-7.8 % SL); predorsal length (31.1-33.0 % SL versus 30.3-30.4 % SL); and pectoral-fin length (17.9-18.6 % SL versus 17.2-17.5 % SL). However, his comparisons were based on only a few specimens, 3 of *C. pembae* and 2 of *C. smithae*, and our examination of larger series (42 specimens of *C. pembae* and 17 of *C. smithae*) indicates considerably more variation in each of these characters. Only lateral scale series is useful to distinguish these 2 species, although there is considerable overlap (37-42, usually 38-41 in *C. pembae* versus 40-45, usually 41-43 in *C. smithae*; Table 3).

One more consistent character not considered by Lubbock is the number of anal-fin spines; although both species have 2-3 spines, *C. pembae* usually has 2 spines whereas *C. smithae* usually has 3 (Table 1). However, this count is difficult to make without good x-radiographs. The difference in number of spines results from the presence or absence of the anterior supernumerary spine of the first pterygiophore, and this spine is usually very small and disassociated from the pterygiophore (particularly when present in *C. pembae*). Perhaps associated with the number of anal-fin spines, the first anal pterygiophore is relatively well developed in *C. smithae*, whereas it is usually reduced considerably in size in *C. pembae* (and often closely applied to the second pterygiophore).

Chlidichthys pembae and *C. smithae* might be confused with *C. chagosensis* from the Chagos Archipelago and *C. inornatus* from Sri Lanka and Maldives, as they resemble these species in size, general coloration and most meristic and morphometric characters. However, they are readily distinguished by their predorsal scalation: in *C. chagosensis* and *C. inornatus* predorsal scales extend only to the supratemporal commissure (versus to the interorbital commissure in *C. pembae* and *C. smithae*).

REMARKS: *Chlidichthys pembae* is a relatively small species; the largest specimen examined is 34.0 mm SL. It has not previously been illustrated in colour.

Following the description of *C. pembae*, Smith (1954: 202) noted that "It will not be surprising if a careful examination of *Pseudoplesiops typus* Bleeker, and of *Nematochromis annae* Weber, prove them to be one and the same and identical with the above." However, *P. typus* and *N. annae* are valid species of *Pseudoplesiops*. Aside from various generic characters (see Gill & Edwards, 1999), *C. pembae* differs from these species in numerous details, including: number of dorsal-fin rays (II,22-23, versus II,24-26 in *P. typus* and I,25-26 in *P. annae*); number of anal-fin rays (II-III,12-13, versus II-III,14-16 in *P. typus* and I,14-16 in *P. annae*) and anterior extent of predorsal scales (to interorbital commissure, versus to supratemporal commissure in *P. typus* and *P. annae*).

Chlidichthys pembae has been collected in rotenone stations with *C. clibanarius* and *C. johnvoelckeri*.

ETYMOLOGY: The specific epithet alludes to the type locality.

MATERIAL EXAMINED: TANZANIA: RUSI 142, 1: 30.2 mm SL (holotype), RUSI 3622, 1: 31.8 mm SL (paratype), Pemba Id, W side, 05°08'S 39°40'E, coral, approximately 27 m, J.L.B. & M.M. Smith. COMORO IDS: ROM 72500, 2: 22.8-27.7 mm SL, Mayotte, patch reef just W of sand bank on Recif Du Sable Blanc (12°58'52"S 045°12'45"E), coral bommie on sand and coral rubble, 3-6 m, R. Winterbottom et al., 14 November 1988; ROM 72501, 1: 28.0 mm SL, Anjouan, off Al Almal Hotel just E of Matsumudu near Missiri (12°09'30'S 044°24'00"E), hard and soft coral, anemones and sponges on sand and rubble, 6-18 m, R. Winterbottom et al., 9 November 1988; BMNH 2001.5.2.7-9, 3: 21.1-22.7 mm SL, ROM 72502, 6: 12.5-24.8 mm SL, ROM 1737CS, 2: 21.2-23.3 mm SL, (subsequently cleared and stained), Moheli, middle of bay at S end of Chissioua Dzaha (12°24'19"S 043°39'10"E), calcareous rock with hard corals, soft corals, algae, anemones, rubble and some sand patches, 12-17 m, R. Winterbottom et al., 26 November 1988; RUSI 63839, 1: 26.5 mm SL, Moheli, Ile Ove ne Ou, P.C. Heemstra, 21 October 1986. MOZAMBIQUE: RUSI 3621, 1: 28.2 mm SL (paratype), Querimba Archipelago, Matemo Id, 12°15'S 40°34'38"E, J.L.B. Smith, 16 August 1951; RUSI 46568, 2: 26.0-27.2 mm SL, Ponta Mamoli, 26°42'S, 32°54'E, P.C. Heemstra & C. Buxton, 30 June 1994; RUSI 50347, 3: 26.4-29.3 mm SL, Ponta Malongane, 26°46'S 32°53'E, P.C. Heemstra, 3 November 1995; RUSI 50429, 1: 25.3 mm SL, Ponta Malongane, 26°46'S 32°53'E, P.C. Heemstra, 4 November 1995; RUSI 50465, 6: 22.4-33.7 mm SL, Ponta Malongane, 26°46'S 32°53'E, T. Andrew, A. Wood & P.C. Heemstra, 2 November 1995; RUSI 50547, 3: 29.8-34.0 mm SL, Ponta Malongane, 26°46'S 32°53'E, P.C. Heemstra & T. Andrew, 1 November 1995. SOUTH AFRICA: RUSI 40282, 5: 28.3-34.6 mm SL, KwaZulu-Natal, Kosi Bay, 2 km S of Kosi mouth, 26°53'S 32°52'E, C. Buxton, 9 August 1992; RUSI 59143, 1: 25.5 mm SL, KwaZulu-Natal, Sodwana, 7-mile Reef, 27°27.088'S 32°42.693'E, P.C. Heemstra, 12 August

1998; RUSI 9385, 1: 23.2 mm SL, KwaZulu-Natal, Sodwana Bay, 27°31'S 32°41'E, M. Smale, 17 April 1979; RUSI 10058, 1: 31.8 mm SL, KwaZulu-Natal, Sodwana Bay, 27°31'S 32°41'E, M.N. Bruton, 24 April 1979; KwaZulu-Natal, Scottburgh, Aliwal Shoal - Cathedral, 30°16'08"S 30°48'07"E, P.C. & E. Heemstra, 22 November 1998.

Chlidichthys randalli Lubbock
Randall's Dottyback
Fig. 3; Pl. 3C

Chlidichthys randalli Lubbock, 1977: 18, pls 2c and 3h (type locality, Flamand Islet, Mauritius; holotype, BPBM 16299); Gill & Randall, 1994: 12 (generic classification); Gill & Edwards, 1999: 147 (list); Fricke, 1999: 215 (list).

DIAGNOSIS: A species of *Chlidichthys* with the following combination of characters: dorsal-fin rays II,22; anal-fin rays III,13; predorsal scales extending to vertical through anterior supraotic pores; lateral scale series 45-47; and ctenoid scales beginning at 3-5 transverse scale rows behind gill opening; orbital rim whitish grey (pale mauve in life); and caudal fin less than 21 % SL.

DESCRIPTION (based on 2 specimens, 33.8-40.5 mm SL): Dorsal-fin rays II,22, last 5 rays branched; anal-fin rays III,13, last 5 rays branched; pectoral-fin rays 18, upper 3 and lower 3-4 (3/4) rays unbranched; pelvic-fin rays I,4, all rays unbranched; principal caudal-fin rays 9 + 8, the uppermost 2 and lowermost 1-2 (1) unbranched; upper procurrent caudal-fin rays 5; lower procurrent caudal-fin rays 5; total caudal-fin rays 27; lateral scale series 45-47 (46/45); predorsal scales 14; transverse scale series 17-18 (17/17); scales behind eye 2; scales to preopercle angle 3; circumpeduncle scales 20-21 (21); ctenoid scales beginning at 3-5 (3/4) transverse scale rows behind gill opening; gill-rakers 4 + 13; pseudobranch filaments 7-8 (7).

Head pores (all bilaterally paired except posterior interorbital pores): nasal pores 2; anterior interorbital pores 1; posterior interorbital pores 0; supraotic pores 2; suborbital pores 7; posterior otic pores 0; preopercle pores 6; dentary pores 4; intertemporal pores 1; anterior temporal pores 0; posttemporal pores 1; parietal pores 2.

As percentage of standard length: body depth at dorsal-fin origin 22.7-23.1 (23.1); greatest body depth 23.7-24.4 (23.7); body width 11.5-11.9 (11.5); head length 29.3-29.4 (29.3); snout 5.7-5.9 (5.9); orbit diameter 9.9-10.9 (10.9); interorbital width 3.6-3.7 (3.6); upper jaw 9.9-10.4 (10.4); caudal peduncle depth 13.3-14.2 (14.2); caudal peduncle length 11.1-11.2 (11.2); predorsal 31.6-32.5 (31.6); preanal 60.0-65.7 (65.7); prepelvic 28.9-30.5 (30.5); first segmented dorsal-fin ray 10.1-13.1 (10.1); third from last segmented dorsal-fin ray 13.0-13.6 (13.0); dorsal-fin base 57.4-60.2 (57.4); first segmented anal-fin ray 9.5-10.4 (9.5); third from last segmented anal-fin ray 13.3-13.6 (13.3); anal-fin base 27.8-28.6 (27.8); caudal fin 20.0 (damaged in holotype); pectoral fin 18.5-18.6 (18.6); pelvic fin 18.0-21.0 (18.0).

Lower lip incomplete; sensory canal of infraorbital 1 not continuous with sensory canal of infraorbital 3; fin spines weak and flexible; anterior dorsal-fin pterygiophore formula S/S/3/1 + 1; 15 consecutive dorsal-fin pterygiophores inserting in 1:1 relationship directly behind neural spine 4; anterior anal-fin pterygiophore formula 3/1 + 1; 7 consecutive anal-fin pterygiophores inserting in 1:1 relationship directly behind haemal spine 2; second segmented pelvic-fin ray longest; caudal fin truncate (after Lubbock, 1977: 18; fin in both specimens now damaged); dorsal and anal fins without scaly sheath, although with a few scales overlapping fin bases; anterior lateral line represented by single tubed scale at gill opening, followed by intermittent series of centrally pitted scales, which terminate beneath segmented dorsal-fin ray 20-22, or just behind termination of dorsal fin (terminate beneath segmented dorsal-fin ray 20/22 in holotype); second intermittent series of centrally pitted scales originating on midside above anal-fin origin, extending on to middle of caudal-fin base; additional 1-4 centrally pitted scales present above and below pitted scale(s) on middle part of caudal-fin base; scales present on cheeks (extending posteriorly over dorsal part of preopercle) and operculum; predorsal scales extending to interorbital commissure (at vertical through anterior supraotic pores); vertebrae 10 + 17; epurals 3; epineurals present on vertebrae 1 through 13-14 (1 through 14); ribs present on vertebrae 3 through 10, the final rib relatively long.

Upper jaw with 3-4 pairs of curved, enlarged caniniform teeth anteriorly, the medial pair smallest, and 5-6 (at symphysis) to 1-2 (on sides of jaw) irregular inner rows of small conical teeth, the teeth on outer row of conical teeth largest; lower jaw with 2-3 pairs of curved, enlarged caniniform teeth, the medial pair smallest, and 3-4 (at symphysis) to 1 (on sides of jaw) irregular inner rows of small conical teeth, the conical teeth gradually increasing in size and becoming more curved and caniniform on middle part of jaw, then becoming abruptly smaller on rear part of jaw; vomer with 1 row of small conical teeth arranged in a chevron; palatines with 1-2 irregular rows of small conical teeth in an elongate patch; tongue pointed, without teeth.

Live coloration (based on photograph of holotype; Pl. 3C): head reddish to greyish brown, pale mauve to bluish grey ventrally and on snout; orbital rim pale mauve; short pale mauve stripe extending from behind mid-posterior edge of eye to just above lateral-line scale; second pale mauve stripe extending around ventral and posterior edges of preopercle to upper part of the operculum; areas immediately above, below and between mauve stripes bright orange-red; iris orange, pale mauve on perimeter, and pale yellow to white around pupil; body reddish to greyish brown, paler ventrally on abdomen, with indistinct dusky grey to brown barring following myomeres on flanks; dorsal and anal fins mauve to bluish olive basally, pinkish hyaline distally; caudal fin reddish olive basally, pinkish hyaline distally; pectoral and pelvic fins pinkish hyaline.

Preserved coloration: pattern generally similar to live coloration, head and body becoming brown, paler ventrally; oribtal rim whitish grey; other pale mauve to bluish grey markings on head and anterior part of body remain, becoming pale brown, but difficult to distinguish; dark bars on flanks remain; dorsal and anal fins dark brown to grey-brown basally, pale brown to hyaline distally; caudal fin brown basally, pale brown to hyaline distally; pectoral and pelvic fins pale brown to hyaline.

HABITAT AND DISTRIBUTION: Known only from 2 type specimens from Flamand Id, Mauritius (Fig. 3). They were collected from around coral heads in 7-18 m.

COMPARISONS: *Chlidichthys randalli* resembles *C. abruptus* and *C. foudioides* in having the following character combination: dorsal-fin rays II,22; anal-fin rays III,13; pectoral-fin rays 18; total caudal-fin rays 27; predorsal scales extending to vertical through anterior supraotic pores; lateral scale series 45-47; and ctenoid scales beginning at 3-5 transverse scale rows behind gill opening. Characters distinguishing the 3 species are discussed under Comparisons for *C. abruptus*.

REMARKS: This is one of 2 pseudochromid species currently known only from Mauritius, the other is *C. smithae* (the paratype of which was collected with the 2 types of *C. randalli*). Despite 6 weeks of intensive collecting in Mauritius, the first author and associates were unable to collect further specimens of *C. randalli*, although 15 specimens of *C. smithae* were collected.

ETYMOLOGY: The specific epithet is for John E. Randall, who collected the type specimens.

MATERIAL EXAMINED: MAURITIUS: BMNH 1975.2.12.25, 1: 40.5 mm SL (paratype), BPBM 16299, 1: 33.8 mm SL (holotype), lagoon side of Flamand Islet, coral heads in 7-18 m, J.E. Randall & M.M. Smith, 3 November 1973.

Chlidichthys rubiceps Lubbock
Redhead Dottyback
Fig. 5; Pl. 3D

Chlidichthys rubiceps Lubbock, 1975: 150, pl. 3a (type locality, Al Korae, Jedda, Saudi Arabia; holotype, BMNH 1973.12.20.166); Lubbock, 1976: 171 (comparison); Lubbock, 1977: 16 (comparison); Dor, 1984: 105 (Red Sea); Goren & Dor, 1994: 28 (Red Sea); Gill & Randall, 1994: 12, 15 (generic classification; comparison); Gill & Edwards, 1999: 147 (list).

Pseudoplesiops rubiceps: Edwards & Randall, 1983: 113 (comparison); Randall, 1983: 60 (comparison).

DIAGNOSIS: A species of *Chlidichthys* with the following combination of characters: predorsal scales extending to supratemporal commissure; suborbital pores 6-7, rarely 7; sensory canal of infraorbital 1 continuous with adjacent infraorbital (infraorbital 3); dorsal-fin rays II,22-24, usually II,23; gill-rakers 3-6 + 11-13 = 14-19; and ctenoid scales beginning at 9-17 transverse scale rows behind gill opening.

DESCRIPTION (based on 35 specimens, 24.7-36.9 mm SL): Dorsal-fin rays II,22-24 (II,24), last 5-9 (6) rays branched; anal-fin rays II-III,13-15 (III,14), last 4-7 (5) rays branched; pectoral-fin rays 16-17 (16/17), upper 2-4 (?/3) and lower 1-4 (4/4) rays unbranched; pelvic-fin rays I,4, all rays unbranched; principal caudal-fin rays 9 + 8, the uppermost 1-3 (2) and lowermost 1-2 (2) rays unbranched; upper procurrent caudal-fin rays 4-6 (5); lower procurrent caudal-fin rays 3-5 (4); total caudal-fin rays 25-28 (26); lateral scale series 40-45 (42/41); predorsal scales 8-12 (9); transverse scale series 15-19 (17/17); scales behind eye 2-3 (2); scales to preopercle angle 3-4 (3); circumpeduncle scales 19-21 (20); ctenoid scales beginning at 9-17 (?/?) transverse scale rows behind gill opening; gill-rakers 3-6 + 11-13 = 14-19 (4 + 12); pseudobranch filaments 5-8 (6).

Head pores (all bilaterally paired except posterior interorbital pores): nasal pores 2; anterior interorbital pores 1; posterior interorbital pores 0-1 (0); supraotic pores 2; suborbital pores 6-7 (6/6); posterior otic pores 0; preopercle pores 6-7 (6/6); dentary pores 3-5 (4/4); intertemporal pores 1; anterior temporal pores 0; posttemporal pores 1; parietal pores 2.

As percentage of standard length (based on 29 specimens, 24.7-33.3 mm SL): body depth at dorsal-fin origin 23.9-28.3 (26.0); greatest body depth 24.6-30.1 (26.4); body width 10.7-12.6 (11.2); head length 28.7-32.8 (30.6); snout 5.1-6.5 (5.4); orbit diameter 8.9-10.5 (9.7); interorbital width 3.3-4.5 (3.5); upper jaw 10.9-12.3 (10.9); caudal peduncle depth 13.3-16.3 (13.6); caudal peduncle length 8.9-11.3 (9.3); predorsal 30.5-34.9 (33.3); preanal 56.5-62.5 (59.3); prepelvic 28.6-33.4 (31.0); first segmented dorsal-fin ray 12.0-21.3 (12.0); third from last segmented dorsal-fin ray 14.7-17.3 (14.7); dorsal-fin base 59.2-63.5 (61.2); first segmented anal-fin ray 10.6-14.2 (11.2); third from last segmented anal-fin ray 13.6-18.2 (13.6); anal-fin base 29.3-33.2 (30.2); caudal fin 22.7-26.0 (23.6); pectoral fin 16.7-20.7 (18.2); pelvic fin 21.1-31.8 (broken in holotype).

Lower lip incomplete; sensory canal of infraorbital 1 continuous with sensory canal of infraorbital 3; fin spines weak and flexible; anterior dorsal-fin pterygiophore formula S/S/3/1 + 1 or S/S/3 + 1/1 + 1 (S/S/3/1 + 1); 15-16 (16) consecutive dorsal-fin pterygiophores inserting in 1:1 relationship directly behind neural spine 4; anterior anal-fin pterygiophore formula 3/1 + 1; 7-8 (8) consecutive anal-fin pterygiophores inserting in 1:1 relationship directly behind haemal spine 2; second segmented pelvic-fin ray longest; caudal fin rounded to truncate; dorsal and anal fins without distinct scaly sheath, although some fish with a few scales overlapping fin bases; anterior lateral line represented by single tubed scale at gill opening, followed by intermittent series of centrally pitted scales, which terminate beneath segmented dorsal-fin ray 19-

24 (?/?); second intermittent series of centrally pitted scales originating on midside at point varying from mid-abdomen to vertical above anterior part of anal fin, extending on to middle part of caudal-fin base; additional 0-2 centrally pitted scales present above and below pitted scale(s) on middle part of caudal-fin base; scales present on cheeks (not extending posteriorly over dorsal part of preopercle) and operculum; predorsal scales extending to supratemporal commissure; vertebrae 10 + 18; epurals 3; epineurals present on vertebrae 1 through 14-18; ribs present on vertebrae 3 through 10, the final rib relatively long.

Upper jaw with 2-4 pairs of curved, enlarged caniniform teeth anteriorly, the medial pair smallest, and 3-4 (at symphysis) to 1-2 (on sides of jaw) irregular inner rows of small conical teeth, the teeth of outer row of conical teeth largest; lower jaw with 2-4 pairs of curved, enlarged caniniform teeth, the medial pair smallest, and 2-4 (at symphysis) to 1 (on sides of jaw) irregular inner rows of small conical teeth, the conical teeth gradually increasing in size and becoming more curved on middle part of jaw, then becoming abruptly smaller on rear part of jaw; vomer with 1-2 irregular rows of small, stout conical teeth arranged in a chevron; palatines with 1-2 irregular rows of small conical teeth; tongue pointed, without teeth.

Live coloration (based on Lubbock, 1975: 151, pl. IIId, and underwater photograph of a fish near Mersa Alam, Egypt; Pl. 3D): head and anterior part of body reddish brown, becoming olive on posterior part of body; snout reddish brown to bright red; iris red to bright red; dorsal and anal fins reddish grey to olive basally, becoming reddish hyaline to light green distally; caudal fin olive basally, becoming light green distally; pectoral and pelvic fins pinkish hyaline to hyaline.

Preserved coloration: head and body dark reddish brown to brown, paler ventrally; snout greyish brown to grey; flanks often with dusky grey to brown barring following myomeres; dorsal and anal fins dark grey brown to dark grey basally, remainder of fin pale brown to hyaline; caudal fin greyish brown basally, pale brown posteriorly, dorsally and ventrally; pectoral fins hyaline; pelvic fins pale brown to hyaline.

HABITAT AND DISTRIBUTION: *Chlidichthys rubiceps* is found throughout the Red Sea, from the Gulf of Aqaba south to the Karaman Archipelago (Fig. 5). It has been collected and observed (Lubbock, 1975) from reefs at depths ranging from 4.5-40 m.

COMPARISONS: *Chlidichthys rubiceps* is closely allied to *C. cacatuoides*, *C. chagosensis* and *C. inornatus*. Characters distinguishing the 4 species are discussed under Comparisons for *C. cacatuoides*.

REMARKS: *Chlidichthys rubiceps* is a relatively small species; the largest specimen examined is 36.9 mm SL. A colour photograph of the holotype when freshly dead is provided by Lubbock (1975).

ETYMOLOGY: The specific epithet is from the Latin *ruber*, meaning "red," and *caput*, meaning "head," and alludes to the live coloration.

MATERIAL EXAMINED: GULF OF AQABA: MNHN 1977-1001, 1: 36.9 mm SL, Israel, Elat, M. Bauchot et al., 1977; USNM 290402, 4: 27.0-33.5 mm SL, Egypt, reef near road at Marsa Muqabila, 4.5 m, V.G. Springer, 17 July 1969; USNM 290526, 1: 31.0 mm SL, Egypt, about 1.5 km N of Ras Burqa, ca. 7.5 m, V.G. Springer, 21 July 1969; USNM 211776, 6: 26.4-30.6 mm SL (paratypes; 6 additional paratypes in this lot not examined in detail), bay at El Himeira, 18 m or less, V.G. Springer et al., 16 July 1969; USNM 290525, 17: 24.7-32.0 mm SL, bay at El Himeira, 9-12 m, V.G. Springer et al., 8 September 1969; BMNH 1973.12.20.171, 1: 21.8 mm SL (paratype), Jordan, Aqaba, 30 m, R. Lubbock & P. Etherington-Smith, January 1973. SAUDI ARABIA: BMNH 1973.12.20.166, 1: 25.8 mm SL (holotype), Jiddah (Jedda), Al Korae, 30 m or less, R. Lubbock & R. Sankey, April 1973; BMNH 1999.1.14.18, 1: 27.2 mm SL (subsequently cleared and stained), Jiddah, J.K.L. Mee. SUDAN: BMNH 1973.12.20.170, 1: 26.2 mm SL (paratype), Port Sudan harbour, 25 m, R. Lubbock & P. Etherington-Smith, August 1972. YEMEN: SMF 28870, 2: 28.2-29.9 mm SL, Karaman Archipelago, Uqban Id, 15°29'N 42°23'E, coral reef, 7-10 m, U. Zajonz & P.C. Heemstra, 12 April 1998.

Chlidichthys smithae Lubbock
Smith's Dottyback
Fig. 5; Pl. 3E

Chlidichthys smithae Lubbock, 1977: 16, pls 2d, 3g and 3h (type locality, Trou d'Eau Douce, Mauritius; holotype, BPBM 16295); Gill & Randall, 1994: 12 (generic classification); Gill & Edwards, 1999: 147 (list); Fricke, 1999: 215 (list).

DIAGNOSIS: A species of *Chlidichthys* with the following combination of characters: dorsal-fin rays II,22-23, usually II,22; anal-fin rays II-III,13-14, usually III,13; pectoral-fin rays 16-18, usually 17; lateral scale series 40-45, usually 41-43; predorsal scales extending to interorbital commissure; and ctenoid scales beginning at 8-14 transverse scale rows behind gill opening.

DESCRIPTION (based on 17 specimens, 20.2-39.4 mm SL): Dorsal-fin rays II,22-23 (II,22), last 5-7 (6) rays branched; anal-fin rays II-III,13-14 (III,13), last 4-6 (5) rays branched; pectoral-fin rays 16-18 (17/17), upper 3-5 (3/3) and lower 2-5 (?/3) rays unbranched; pelvic-fin rays I,4, all rays unbranched; principal caudal-fin rays 9 + 8, the uppermost 2 and lowermost 1-2 (?) rays branched; upper procurrent caudal-fin rays 5; lower procurrent caudal-fin rays 4-5 (5); total caudal-fin rays 26-27 (27); lateral scale series 40-45 (43/43); predorsal scales 11-15 (15); transverse scale series 15-17 (17/16); scales behind eye 2-3 (2); scales to preopercle angle 3; circumpeduncle scales 19-20 (20); ctenoid scales beginning at 8-14 (12/12) transverse scale rows behind gill opening; gill-rakers

3-4 + 10-11 = 13-15 (3 + 11); pseudobranch filaments 5-8 (5).

Head pores (all bilaterally paired except posterior interorbital pores): nasal pores 2; anterior interorbital pores 1; posterior interorbital pores 0; supraotic pores 2; suborbital pores 7-8 (7/7); posterior otic pores 0; preopercle pores 6; dentary pores 3-4 (3/4); intertemporal pores 1; anterior temporal pores 0; posttemporal pores 1; parietal pores 2.

As percentage of standard length (based on 13 specimens, 20.2-39.4 mm SL): body depth at dorsal-fin origin 22.0-24.3 (22.3); greatest body depth 22.8-27.1 (24.6); body width 11.0-15.0 (11.2); head length 28.4-32.2 (28.4); snout 4.8-6.2 (5.3); orbit diameter 7.9-10.9 (7.9); interorbital width 3.7-4.4 (3.8); upper jaw 10.2-11.8 (10.2); caudal peduncle depth 13.4-15.8 (14.7); caudal peduncle length 10.3-12.7 (12.7); predorsal 30.8-35.6 (31.0); preanal 58.2-62.2 (59.1); prepelvic 27.9-31.3 (27.9); first segmented dorsal-fin ray 8.9-10.0 (broken in holotype); third from last segmented dorsal-fin ray 14.7-16.9 (16.0); dorsal-fin base 56.3-60.4 (60.4); first segmented anal-fin ray 10.0-11.6 (11.4); third from last segmented anal-fin ray 14.7-16.1 (broken in holotype); anal-fin base 26.7-30.1 (27.9); caudal fin 22.6-24.3 (broken in holotype); pectoral fin 17.5-20.3 (19.0); pelvic fin 20.8-30.0 (20.8).

Lower lip incomplete; sensory canal of infraorbital 1 not continuous with sensory canal of infraorbital 3; fin spines weak and flexible; anterior dorsal-fin pterygiophore formula S/S/3/1 + 1; 15-16 (15) consecutive dorsal-fin pterygiophores inserting in 1:1 relationship directly behind neural spine 4; anterior anal-fin pterygiophore formula 2/1 + 1, 3/1 + 1, /2 + 1 + 1 or /3 + 1 + 1 (3/1 + 1); 6-7 (6) consecutive anal-fin pterygiophores inserting in 1:1 relationship directly behind haemal spine 2; second segmented pelvic-fin ray longest; caudal fin rounded to truncate or slightly emarginate; dorsal and anal fins without distinct scaly sheath, although some fish with a few scales overlapping fin bases; anterior lateral line represented by single tubed scale at gill opening, followed by intermittent series of centrally pitted scales, which terminate beneath segmented dorsal-fin ray 17-23 (20/20); second intermittent series of centrally pitted scales originating on midside at point varying from mid-abdomen to vertical above anterior part of anal fin, extending on to middle part of caudal-fin base; additional 1-3 centrally pitted scales present above and below pitted scale(s) on middle part of caudal-fin base; scales present on cheeks (extending posteriorly over dorsal part of preopercle) and operculum; predorsal scales extending to interorbital commissure (at point ranging from vertical through anterior supraotic pore to about half-way between anterior supraotic and anterior interorbital pores); vertebrae 10 + 17-18 (10 + 17); epurals 3; epineurals present on vertebrae 1 through 15-18 (1 through 16); ribs present on vertebrae 3 through 10, the final rib relatively long.

Upper jaw with 2-4 pairs of curved, enlarged caniniform teeth anteriorly, the medial pair smallest, and 3-5 (at symphysis) to 1-2 (on sides of jaw) irregular inner rows of small conical teeth, the teeth of outer row of conical teeth largest; lower jaw with 2-4 pairs of curved, enlarged caniniform teeth, the medial pair smallest, and 2-4 (at symphysis) to 1 (on sides of jaw) irregular inner rows of small conical teeth, the conical teeth gradually increasing in size and becoming more curved on middle part of jaw, then becoming abruptly smaller on rear part of jaw; vomer with 1-2 irregular rows of small, stout conical teeth arranged in a chevron; palatines with 1-2 irregular rows of small conical teeth; tongue pointed, without teeth.

Live coloration (based on field notes and photographs of specimens from Mauritius, including photographs of the holotype and paratype; Pl. 3E): head and body pale brown to reddish brown, orangish brown or orange, sometimes paler ventrally on head; scales on cheek, operculum and body sometimes with reddish brown to orange or red basal spot; snout, lips and interorbital sometimes greyish brown to dark grey; posterior part of orbital rim sometimes dusky brown to dark grey; iris yellow to bright orange; sides of body sometimes with dusky brown markings following myomere positions; dorsal fin yellowish to reddish hyaline, sometimes bluish grey basally, with several rows of yellow to dark brown spots, and sometimes with blue distal margin; anal fin bluish grey basally, sometimes with a row of yellow spots, followed by red to bright yellow stripe, outer part of fin yellowish to reddish hyaline, sometimes with distal margin blue; caudal fin greyish brown to dusky red or orange basally, becoming reddish hyaline to dusky yellow posteriorly; pectoral and pelvic fins pinkish or reddish hyaline to hyaline.

Preserved coloration: pattern generally similar to live coloration, head and body becoming pale brown to brown, paler ventrally; snout usually grey to greyish brown; dark mark on orbital rim remains, becoming dark greyish brown; reddish brown to orange or red basal spots on head and body usually absent, sometimes present, becoming brown; dusky brown markings following myomere positions often present on sides, particularly above anal fin; dorsal and anal fins pale brown to dark brown or hyaline, often with basal part of fin abruptly dark grey-brown or pale brown, contrasting with distal part of fin; caudal fin pale brown to dark brown basally, remainder of fin pale brown to hyaline; pectoral and pelvic fins pale brown to hyaline.

HABITAT AND DISTRIBUTION: This species is known only from Mauritius (Fig. 5). It has been collected around coral and rock reefs in 6-30 m. The largest collection (7 specimens) was from a very rich coral area (mostly lettuce and branching corals) with silt bottom in 11-13 m.

COMPARISONS: *Chlidichthys smithae* closely resembles *C. pembae* in having the following character combination: dorsal-fin rays usually II,22; usually 13 segmented anal-fin rays; pectoral-fin rays usually 17; predorsal scales extending to interorbital commissure; and ctenoid scales beginning at 8-14 transverse scale rows behind gill opening. Characters distinguishing the 2 species are

discussed under Comparisons for *C. pembae*.

REMARKS: *Chlidichthys smithae* is a relatively small species; the largest specimen examined is 39.4 mm SL. Colour photographs of the holotype and paratype of the species are provided by Lubbock (1977).

ETYMOLOGY: The specific epithet is for Margaret M. Smith, who assisted with the collection of the type specimens, and aided Roger Lubbock with his studies of western Indian Ocean pseudochromids.

MATERIAL EXAMINED: MAURITIUS: USNM 344310, 2: 29.2 mm SL, W coast, off Pointe aux Caves lighthouse (20°11'18"S 057°24'00"E), 25-26 m, P.C. Heemstra, A.C. Gill, M.J. Smale et al., 4 May 1995; USNM 344307, 2: 24.5-24.8 mm SL, W coast, Baie de la Petite Riviere, off Albion Fisheries Research Centre, 24 m, P.C. Heemstra, A.C. Gill, D.G. Smith et al., 25 April 1995; USNM 344309, 1: 29.1 mm SL, W coast, Baie de la Petite Riviere, off Albion Fisheries Research Centre, along base of rock and coral reef with small caves, 30 m, P.C. Heemstra, A.C. Gill, D.G. Smith et al., 26 May 1995; BMNH 2001.5.9.1, 1: 26.8 mm SL, RUSI 64842, 1: 21.7 mm SL, USNM 344308, 1: 32.8 mm SL, W coast, La Preneuse, Black River Pass (20°21'40"S 057°20'40"E), small coral knoll with caves and adjacent coral reef, 24-26 m, P.C. Heemstra, A.C. Gill, M.J. Smale et al., 10 May 1995; BPBM 16295, 1: 39.4 mm SL (holotype), Trou d'Eau Douce, coral slope on to silt bottom, 6-7 m, J.E. Randall & M.M. Smith, 31 October 1973; BMNH 1975.2.12.26, 1: 33.2 mm SL (paratype), lagoon side of Flamand Islet, coral heads in 7-18 m, J.E. Randall & M.M. Smith, 3 November 1973; BMNH 2001.5.9.2-3, 2: 25.4-32.7 mm SL, BMNH 2001.5.9.4, 1: 33.8 mm SL (subsequently cleared and stained), RUSI 64843, 3: 20.2-30.5 mm SL, USNM 344311, 1: 31.1 mm SL, SE coast, ca. 500 m E of Pointe Bambou, rich lettuce and other hard and soft coral on silt bottom, 11-13 m, P.C. Heemstra, A.C. Gill, D.G. Smith, M.J. Smale et al., 19 May 1995.

Pectinochromis Gill & Edwards

Pectinochromis Gill & Edwards, 1999: 147 (type species: *Pseudoplesiops lubbocki* Edwards & Randall, 1983 by original designation).

DIAGNOSIS: *Pectinochromis* is distinguished from other pseudoplesiopine genera and demonstrably monophyletic in having the following 6 autapomorphies: first dorsal-fin pterygiophore expanded anteriorly; first dorsal-fin pterygiophore with lateral processes; second pterygiophore of dorsal fin inserts between neural spines 3 and 4; dorsal fin anteriorly positioned (origin above vertical through preopercle); supraneural bones usually either single or absent (rarely 2); and gill-rakers relatively numerous (total rakers on outer face of first arch 28-31). Other characters useful in identifying the genus are: dorsal-fin rays II,22-23, last 15-20 rays branched; anal-fin rays II,12-13, last 7-13 rays branched; total caudal-fin rays 24-26 (incorrectly reported as 22-24 by Gill & Edwards, 1999: table 2); pelvic-fin rays I,4, all rays unbranched; lateral scale series 33-39; pelvic bones not deeply cupped; vertebrae 10 + 16-17; epurals 3; second infraorbital bone without sensory canal, the sensory canal of first infraorbital bone not continuous with remaining infraorbitals (Fig. 2D); extrascapular bones tubular, without plate-like laminar projections; suborbital pores 7 (Figs 1D, 2D); preopercle pores 6, with the upper 2 pores widely separated from each other (Fig. 1D); and lower lip complete.

REMARKS: The above autapomorphies of *Pectinochromis* are illustrated and discussed in greater detail by Gill & Edwards (1999). One (their character 18) deserves further discussion. Gill & Edwards (1999) proposed the presence of a single supraneural bone as an autapomorphy of *Pectinochromis*, and illustrated a cleared-and-stained specimen with this condition (fig. 13E). Subsequent examination of x-radiographs of the 14 available specimens of the genus indicates that this character is more variable than was stated. In one specimen there are 2 supraneural bones (one anterior to neural spine 1, and the other between neural spines 1 and 2), the condition also found in *Lubbockichthys* and most *Chlidichthys* species (as well as several species of *Pseudoplesiops*; *Amsichthys* and most *Pseudoplesiops* species have 3 supraneural bones). A single supraneural bone is present in 3 specimens, and possibly present in 4 others. The remaining 6 specimens lack apparent supraneural bones. We have accordingly modified the character to "supraneural bones usually either single or absent."

Although *Pectinochromis* is currently monotypic and restricted to the Red Sea, it is found in relatively deep (52-70 m) reef areas. As this habitat has been poorly sampled, the discovery of additional species of *Pectinochromis* from outside the Red Sea would not be surprising.

ETYMOLOGY: The generic name is from the Latin *pecten*, a comb or rake, and the Greek *Chromis*, a genus of pomacentrid fish, which has been used as a suffix for various pseudochromid genera (e.g., *Pholidochromis*, *Pseudochromis* and *Nematochromis*), and alludes to the relatively high number of gill-rakers. Gender is feminine.

Pectinochromis lubbocki **(Edwards & Randall)**
Lubbock's Dottyback
Figs 1D, 2D, 3; Pl. 3F

Pseudoplesiops lubbocki Edwards & Randall, 1983: 112, fig. 1 (type locality: Ras Abu-Galum, Gulf of Aqaba; holotype, BPBM 28114); Randall, 1983: 60 (comparison); Dor, 1984: 433 (Red Sea); Goren & Dor, 1994: 28 (Red Sea).

Pectinochromis lubbocki: Gill & Edwards, 1999: 147, figs 5, 9E, 10E, 12E, 13E and 14E (classification, anatomy and relationships).

DIAGNOSIS: As for genus.

DESCRIPTION (based on 14 specimens, 21.5-35.5 mm SL): Dorsal-fin rays II,22-23 (II,22), last 15-20 (18) rays branched; anal-fin rays II,12-13 (II,13), last 7-13 (13) rays branched; pectoral-fin rays 16-17 (17/17), upper 3-4 (3/3) and lower 2-3 (3/2) rays unbranched; pelvic-fin rays I,4, all rays unbranched; principal caudal-fin rays 9 + 8, the uppermost 1-2 (1) and lowermost 1-2 (1) rays unbranched; upper procurrent caudal-fin rays 4-5 (4); lower procurrent caudal-fin rays 3-4 (4); total caudal-fin rays 24-26 (25); lateral scale series 33-39 (35/37); predorsal scales 8-11 (9); transverse scale series 15-19 (17/17); scales behind eye 1-2 (2); scales to preopercle angle 3-5 (4); circumpeduncle scales 20; ctenoid scales beginning at 5-8 (7/7) transverse scale rows behind gill opening; gill-rakers 9-11 + 18-20 = 28-31 (9 + 19); pseudobranch filaments 8-9 (8).

Head pores (all bilaterally paired except posterior interorbital pores; Fig. 1D): nasal pores 2; anterior interorbital pores 1; posterior interorbital pores 0; supraotic pores 2; suborbital pores 7; posterior otic pores 0; preopercle pores 6; dentary pores 4; intertemporal pores 1; anterior temporal pores 0; posttemporal pores 1; parietal pores 2-3 (2/2).

As percentage of standard length: body depth at dorsal-fin origin 26.5-29.4 (27.2); greatest body depth 30.1-34.3 (30.1); body width 12.7-14.4 (13.2); head length 27.3-30.1 (28.7); snout 5.1-6.6 (5.6); orbit diameter 9.4-11.9 (9.4); interorbital width 6.4-7.7 (7.3); upper jaw 11.0-12.5 (11.7); caudal peduncle depth 15.2-17.6 (17.3); caudal peduncle length 9.5-11.6 (10.8); predorsal 22.4-28.8 (23.7); preanal 56.3-61.2 (58.2); prepelvic 29.3-33.0 (30.7); first segmented dorsal-fin ray 13.7-16.3 (13.7); third from last segmented dorsal-fin ray 14.0-17.7 (14.0); dorsal-fin base 67.0-75.2 (71.9); first segmented anal-fin ray 9.9-12.8 (9.9); third from last segmented anal-fin ray 15.2-18.5 (15.2); anal-fin base 30.7-34.9 (34.2); caudal fin 28.9-32.4 (28.9); pectoral fin 20.5-26.2 (22.8); pelvic fin 25.7-33.9 (25.7).

Lower lip complete; sensory canal of infraorbital 1 not continuous with sensory canal of infraorbital 3 (Fig. 2D); fin spines weak and flexible; anterior dorsal-fin pterygiophore formula S/S/3 + 1/1, S//3 + 1/1 or //3 + 1/1 (//3 + 1/1); 15 consecutive dorsal-fin pterygiophores inserting in 1:1 relationship directly behind neural spine 4; anterior anal-fin pterygiophore formula 2/1 + 1 or 2/1 (2/1 + 1); 6-7 (7) consecutive anal-fin pterygiophores inserting in 1:1 relationship directly behind haemal spine 2; second segmented pelvic-fin ray longest; caudal fin weakly rounded to rounded; dorsal and anal fins without distinct scaly sheath, although some fish with a few scales overlapping fin bases; anterior lateral line represented by single tubed scale at gill opening, followed by intermittent series of centrally pitted scales, which terminate beneath segmented dorsal-fin ray 17-22 or extend slightly behind dorsal fin termination (terminate beneath segmented dorsal-fin ray 21/18 in holotype); second intermittent series of centrally pitted scales originating on midside above anterior part to middle of anal fin, extending on to middle of caudal-fin base; additional 1-2 centrally pitted scales sometimes present above and below pitted scale(s) on middle part of caudal-fin base; scales present on cheeks (extending posteriorly over upper part of preopercle) and operculum; predorsal scales extending to interorbital commissure (at point ranging from midway between anterior supraotic and anterior interorbital pores to anterior interorbital pores; Fig. 1D); vertebrae 10 + 16-17 (10 + 17); epurals 3; epineurals present on vertebrae 1 through 14-15 (1 through 14); ribs present on vertebrae 3 through 10, the final rib relatively long.

Upper jaw with 2-6 pairs of curved, enlarged caniniform teeth anteriorly, the medial pair smallest, and 4-5 (at symphysis) to 1-2 (on sides of jaw) irregular inner rows of small conical teeth, the teeth on outer row of conical teeth largest; lower jaw with 2-6 pairs of curved, enlarged caniniform teeth, the medial pair smallest, and 2-4 (at symphysis) to 1 (on sides of jaw) irregular inner rows of small conical teeth, the conical teeth gradually increasing in size and becoming more curved and caniniform on middle part of jaw, then becoming abruptly smaller on rear part of jaw; vomer with 1-2 rows of small conical teeth arranged in a chevron; palatines with 1-2 irregular rows of small conical teeth in an elongate patch; tongue pointed, without teeth.

Live coloration (based on colour photographs of holotype and of an aquarium specimen collected in the Gulf of Aqaba; Pl. 3F): head dull pink, becoming pinkish to bluish grey on nape, and yellowish brown over lower part of operculum; mauve to white streak on side of upper jaw; orbital rim brownish yellow to dark purple, with 2 small purple to mauve spots on interorbital region above middle of eye; iris bright yellow anteriorly and posteriorly, and red to bright blue dorsally and ventrally; body pale pink to pale yellowish brown, shading to pale pinkish grey anteriodorsally, yellowish green posteriorly and pale brown to white on abdomen; rear of body with yellow spots and lines following myosepta; anterior half of dorsal fin pale pink distally, light blue to hyaline distally, with 1-2 dark grey to black elongate spots extending in line along distal margin of fin between tip of first spine and second segmented ray; posterior part of dorsal fin pale pinkish yellow to yellow basally, remainder of fin pale blue to hyaline with several indistinct rows of yellow spots and stripes; anal fin pale yellow to yellowish hyaline, with several pale blue irregular stripes; caudal fin dull yellowish green to bright yellow basally, yellowish or pinkish hyaline to hyaline posteriorly, with several pale blue to blue oblique stripes, which converge distally on central rays; pectoral fin pinkish to yellowish hyaline; pelvic fins pinkish to bluish white.

Preserved coloration: head and body pale yellowish brown, paler ventrally; dorsal and anal fins dusky brown to pale brown basally becoming hyaline distally; dark elongate spots on anterior part of dorsal fin become dark greyish brown to brown; caudal fin pale brown basally becoming hyaline distally; pectoral and pelvic fins pale brown to hyaline.

HABITAT AND DISTRIBUTION: *Pectinochromis lubbocki* is known only from the Red Sea, from the Gulf of Aqaba south to Port Sudan, Sudan (Fig. 3). It has been collected from the base of reef fronts and drop-offs at depths ranging from 52-70 m.

COMPARISONS: *Pectinochromis lubbocki* is a distinctive species that is unlikely to be confused with any other pseudoplesiopine. The anteriorly postitioned dorsal fin (origin above the preopercle versus above the posterior edge of the operculum in other pseudoplesiopines) and high number of outer first-gill-arch rakers (28-31 versus 9-21 in other pseudoplesiopines) are particularly distinctive. Additional characters are noted above under Diagnosis and Remarks for the generic account and by Gill & Edwards (1999).

REMARKS: *Pectinochromis lubbocki* is a relatively small species; the largest specimen examined is 35.5 mm SL. A colour photograph of the holotype is provided in Edwards & Randall (1983).

ETYMOLOGY: The specific epithet is for Hugh Roger Lubbock in recognition of his major contribution to pseudoplesiopine taxonomy.

MATERIAL EXAMINED: RED SEA: BMNH 1982.6.9.1-4, 4: 30.1-32.7 mm SL (paratypes), BPBM 28114, 1: 34.2 mm SL (holotype), BPBM 28119, 2: 30.1-35.5 mm SL (paratypes), USNM 233899, 4: 25.0-31.4 mm SL (paratypes), Gulf of Aqaba, E side of Sinai Peninsula, Ras Abu-Galum, base of drop-off in 52-55 m, rotenone, J.E. Randall, O. Gon & R. Kurutz, 2 August 1976; BPBM 19699, 2: 31.8-33.6 mm SL (paratypes), S tip of Sinai Peninsula, Ras Muhammad, base of reef front off stone jetty, rock and silty sand in 70 m, rotenone, J.E. Randall, O. Gon & A. Baranes, 26 October 1975; BPBM 28118, 1: 21.5 mm SL (paratype), 1 mile N of entrance to Port Sudan, reef front, 60 m, rotenone, J.E. Randall, 9 October 1975.

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Table 1. Counts of segmented dorsal-fin rays, anal-fin rays and pectoral-fin rays for species of *Chlidichthys* and *Pectinochromis*. Bilateral counts of pectoral-fin rays are included.

	Segmented dorsal-fin rays										Anal-fin rays						Pectoral-fin rays						
	21	22	23	24	$\bar{x}$	SD	II	III	$\bar{x}$	SD	12	13	14	15	$\bar{x}$	SD	15	16	17	18	19	$\bar{x}$	SD
C. abruptus	1	23	-	-	22.0	0.2	3	21	2.9	0.3	2	22	-	-	12.9	0.3	-	-	3	41	3	18.0	0.4
C. auratus	-	2	29	-	22.9	0.2	-	31	3.0	0.0	-	3	26	2	14.0	0.4	1	51	6	-	-	16.1	0.3
C. bibulus	-	-	13	-	23.0	0.0	1	12	2.9	0.3	-	1	11	1	14.0	0.4	-	4	19	1	-	16.9	0.4
C. cacatuoides	-	-	4	1	23.2	0.4	-	5	3.0	0.0	-	-	4	1	14.2	0.4	-	-	6	4	-	17.4	0.5
C. chagosensis	-	30	-	-	22.0	0.0	-	30	3.0	0.0	-	30	-	-	13.0	0.0	-	5	51	4	-	17.0	0.4
C. clibanarius	-	4	35	1	22.9	0.3	-	40	3.0	0.0	-	2	38	-	14.0	0.2	-	3	58	18	-	17.2	0.5
C. foudioides	-	28	1	-	22.0	0.2	1	28	3.0	0.2	1	27	1	-	13.0	0.3	-	-	9	47	2	17.9	0.4
C. inomatus	1	27	-	-	22.0	0.2	2	26	2.9	0.3	-	26	2	-	13.1	0.3	-	2	40	5	1	17.1	0.5
C. johnvoelcker	-	28	1	-	22.0	0.2	1	28	3.0	0.2	-	29	-	-	13.0	0.0	-	7	43	8	-	17.0	0.5
C. pembae	-	41	1	-	22.0	0.2	36	6	2.1	0.4	1	41	-	-	13.0	0.2	1	7	68	4	-	16.9	0.4
C. randalli	-	2	-	-	22.0	0.0	-	2	3.0	0.0	-	2	-	-	13.0	0.0	-	-	-	4	-	18.0	0.0
C. rubiceps	-	2	30	3	23.0	0.4	1	34	3.0	0.2	-	1	32	2	14.0	0.3	-	29	36	-	-	16.6	0.5
C. smithae	-	15	2	-	22.1	0.3	4	13	2.8	0.4	-	16	1	-	13.1	0.2	-	1	29	4	-	17.1	0.4
P. lubbocki	-	13	1	-	22.1	0.3	14	-	2.0	0.0	2	12	-	-	12.9	0.4	-	9	14	-	-	16.6	0.5

Table 2. Caudal fin ray counts for species of *Chlidichthys* and *Pectinochromis*.

	Upper Procurrent						Lower Procurrent						Total Caudal-fin Rays								
	4	5	6	7	$\bar{x}$	SD	3	4	5	6	$\bar{x}$	SD	24	25	26	27	28	29	30	$\bar{x}$	SD
C. abruptus	-	17	4	-	5.2	0.4	-	2	19	-	4.9	0.3	-	-	2	15	4	-	-	27.1	0.5
C. auratus	1	23	1	-	5.0	0.3	-	7	18	-	4.7	0.5	-	1	6	17	1	-	-	26.7	0.6
C. bibulus	-	12	1	-	5.1	0.3	-	1	12	-	4.9	0.3	-	-	1	11	1	-	-	27.0	0.4
C. cacatuoides	1	4	-	-	4.8	0.4	-	4	1	-	4.2	0.4	-	1	3	1	-	-	-	26.0	0.7
C. chagosensis	2	28	-	-	4.9	0.3	-	7	22	-	4.8	0.4	-	2	5	22	-	-	-	26.7	0.6
C. clibanarius	1	29	10	-	5.2	0.5	-	6	33	1	4.9	0.4	-	1	4	25	10	-	-	27.1	0.7
C. foudioides	-	29	-	-	5.0	0.0	-	4	25	-	4.9	0.4	-	-	4	25	-	-	-	26.9	0.4
C. inomatus	2	24	2	-	5.0	0.4	-	7	21	-	4.8	0.4	-	2	4	21	1	-	-	26.8	0.6
C. johnvoelcker	-	1	27	1	6.0	0.3	-	-	7	22	5.8	0.4	-	-	-	-	8	20	1	28.8	0.5
C. pembae	1	39	2	-	5.0	0.3	-	6	35	-	4.9	0.4	-	-	6	34	1	-	-	26.9	0.4
C. randalli	-	2	-	-	5.0	0.0	-	-	2	-	5.0	0.0	-	-	-	2	-	-	-	27.0	0.0
C. rubiceps	2	26	3	-	5.0	0.4	1	19	10	-	4.3	0.5	-	2	19	7	3	-	-	26.4	0.8
C. smithae	-	17	-	-	5.0	0.0	-	1	16	-	4.9	0.2	-	-	1	16	-	-	-	26.9	0.2
P. lubbocki	13	1	-	-	4.1	0.3	2	12	-	-	3.9	0.4	2	11	1	-	-	-	-	24.9	0.5

Table 3. Counts of lateral scale series for species of *Chlidichthys* and *Pectinochromis*.

	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	$\bar{x}$	SD
C. abruptus	-	-	-	-	-	-	-	-	-	1	4	4	16	17	5	1	-	-	-	-	45.3	1.2
C. auratus	-	-	-	-	-	-	-	2	3	4	10	12	14	6	4	-	-	-	-	-	44.1	1.7
C. bibulus	-	-	-	-	-	-	-	-	-	-	-	-	3	6	7	6	-	-	-	-	46.7	1.0
C. cacatuoides	-	-	-	-	2	-	3	3	-	-	-	-	-	-	-	-	-	-	-	-	38.9	1.2
C. chagosensis	-	-	1	-	2	4	17	17	3	4	1	-	-	-	-	-	-	-	-	-	39.6	1.4
C. clibanarius	-	-	-	-	-	-	-	-	-	-	1	4	18	18	22	13	2	-	-	-	46.3	1.3
C. foudioides	-	-	-	-	-	-	-	-	-	-	-	1	13	13	21	8	1	1	-	-	46.5	1.2
C. inornatus	-	-	-	-	-	1	2	17	17	12	1	-	-	-	-	-	-	-	-	-	40.8	1.0
C. johnvoelckeri	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	9	13	14	8	3	49.5	1.3
C. pembae	-	-	-	-	1	8	21	19	22	4	-	-	-	-	-	-	-	-	-	-	39.9	1.2
C. randalli	-	-	-	-	-	-	-	-	-	-	-	-	1	2	1	-	-	-	-	-	46.0	0.8
C. rubiceps	-	-	-	-	-	-	-	9	12	11	18	12	4	-	-	-	-	-	-	-	42.4	1.5
C. smithae	-	-	-	-	-	-	-	2	8	10	10	2	2	-	-	-	-	-	-	-	42.2	1.2
P. lubbocki	1	-	10	5	3	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	36.0	1.5

Table 4. Numbers of predorsal scales and transverse scale rows above anal-fin origin in species of *Chlidichthys* and *Pectinochromis*.

	Predorsal scales																Transverse scale series										
	6	7	8	9	10	11	12	13	14	15	16	17	18	19	$\bar{x}$	SD	14	15	16	17	18	19	20	21	22	$\bar{x}$	SD
C. abruptus	-	-	-	-	-	1	3	12	7	-	1	-	-	-	13.2	1.0	-	-	-	8	17	15	8	-	-	18.5	1.0
C. auratus	-	-	-	-	-	-	5	12	7	4	-	-	-	-	13.4	1.0	-	-	3	20	27	2	-	-	-	17.5	0.7
C. bibulus	-	-	-	-	-	-	1	3	2	4	1	-	-	-	14.1	1.2	-	-	-	-	1	10	9	2	-	19.5	0.7
C. cacatuoides	-	2	1	1	-	-	-	-	-	-	-	-	-	-	7.8	1.0	-	-	-	2	5	-	1	-	-	18.0	0.9
C. chagosensis	1	3	8	11	3	-	-	-	-	-	-	-	-	-	8.5	1.0	1	17	16	10	2	-	-	-	-	15.9	0.9
C. clibanarius	-	-	-	-	-	-	2	8	10	7	9	4	-	-	14.6	1.4	-	-	-	-	19	38	18	3	-	19.1	0.8
C. foudioides	-	-	-	-	-	-	1	4	5	13	5	1	-	-	14.7	1.1	-	-	-	4	13	29	11	1	-	18.9	0.9
C. inornatus	-	1	8	8	8	1	-	-	-	-	-	-	-	-	9.0	1.0	-	7	18	19	6	1	-	-	-	16.5	0.9
C. johnvoelckeri	-	-	-	-	-	-	-	1	-	4	7	7	5	1	16.5	1.3	-	-	-	-	1	14	26	7	1	19.9	0.8
C. pembae	-	-	-	3	6	10	15	4	-	-	-	-	-	-	11.3	1.1	-	8	41	27	-	-	-	-	-	16.3	0.6
C. randalli	-	-	-	-	-	-	-	-	2	-	-	-	-	-	14.0	0.0	-	-	-	2	2	-	-	-	-	17.5	0.6
C. rubiceps	-	-	3	6	12	11	1	-	-	-	-	-	-	-	10.0	1.0	-	4	14	27	14	3	-	-	-	17.0	1.0
C. smithae	-	-	-	-	-	5	5	4	1	1	-	-	-	-	12.3	1.2	-	1	27	6	-	-	-	-	-	16.1	0.4
P. lubbocki	-	-	2	1	7	3	1	-	-	-	-	-	-	-	10.0	1.1	-	1	3	9	1	2	-	-	-	17.0	1.0

Table 5. Numbers of scales behind eye, scales to preopercle angle and circumpeduncle scales in species of *Chlidichthys* and *Pectinochromis*.

	Scales behind eye					Scales to preopercle angle						Circumpeduncle scales										
	1	2	3	$\bar{x}$	SD	2	3	4	5	$\bar{x}$	SD	17	18	19	20	21	22	23	24	25	$\bar{x}$	SD
C. abruptus	-	24	-	2.0	0.0	-	11	12	1	3.6	0.6	-	-	1	23	-	-	-	-	-	20.0	0.2
C. auratus	1	24	3	2.1	0.4	-	27	1	-	3.0	0.2	-	-	-	27	1	-	-	-	-	20.0	0.2
C. bibulus	-	8	2	2.2	0.4	-	1	7	2	4.1	0.6	-	-	-	1	2	4	3	-	-	21.9	1.0
C. cacatuoides	-	4	-	2.0	0.0	-	1	3	-	3.8	0.5	-	1	-	3	-	-	-	-	-	19.5	1.0
C. chagosensis	-	26	-	2.0	0.0	-	25	1	-	3.0	0.2	-	1	2	22	-	-	-	-	-	19.9	0.5
C. clibanarius	-	31	9	2.2	0.4	-	19	21	-	3.5	0.5	-	-	-	32	6	1	1	-	-	20.3	0.6
C. foudioides	-	25	4	2.1	0.4	-	7	22	-	3.8	0.4	-	-	1	28	-	-	-	-	-	20.0	0.2
C. inornatus	1	22	3	2.1	0.4	-	23	3	-	3.1	0.3	1	3	2	20	-	-	-	-	-	19.6	0.9
C. johnvoelckeri	-	16	8	2.3	0.5	-	5	21	-	3.8	0.4	-	-	-	-	-	1	6	16	3	23.8	0.7
C. pembae	1	37	2	2.0	0.3	-	38	1	-	3.0	0.2	-	3	2	35	-	-	-	-	-	19.8	0.6
C. randalli	-	2	-	2.0	0.0	-	2	-	-	3.0	0.0	-	-	-	1	1	-	-	-	-	20.5	0.7
C. rubiceps	-	31	3	2.1	0.3	-	26	8	-	3.2	0.4	-	-	2	31	1	-	-	-	-	20.0	0.3
C. smithae	-	16	1	2.1	0.2	-	17	-	-	3.0	0.0	-	-	2	15	-	-	-	-	-	19.9	0.3
P. lubbocki	3	5	-	1.6	0.5	-	1	12	1	4.0	0.4	-	-	-	10	-	-	-	-	-	20.0	0.0

Table 6. Position of first ctenoid scale (in terms of the number of transverse scale rows behind the gill opening) for species of *Chlidichthys* and *Pectinochromis*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	$\bar{x}$	SD
C. abruptus	-	3	16	12	9	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.8	1.0
C. auratus	-	-	-	-	-	2	4	5	6	8	5	2	4	1	1	-	-	-	-	-	9.8	2.2
C. bibulus	1	17	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.0	0.3
C. cacatuoides	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	2	-	1	18.0	1.2
C. chagosensis	-	-	-	-	-	-	-	2	1	2	5	1	2	1	-	-	-	-	-	-	10.9	1.8
C. clibanarius	4	54	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.1	0.5
C. foudioides	-	8	19	16	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.3	0.9
C. inornatus	-	-	-	-	-	-	-	4	10	14	5	6	3	1	1	-	-	-	-	-	10.4	1.6
C. johnvoelckeri	-	-	4	13	12	8	2	1	-	-	-	-	-	-	-	-	-	-	-	-	4.9	1.2
C. pembae	-	-	-	-	-	-	2	5	6	15	13	3	-	1	-	-	-	-	-	-	10.0	1.4
C. randalli	-	-	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.0	1.0
C. rubiceps	-	-	-	-	-	-	-	-	1	10	7	11	7	7	2	-	1	-	-	-	12.0	1.7
C. smithae	-	-	-	-	-	-	-	1	-	2	12	4	4	5	-	-	-	-	-	-	11.8	1.5
P. lubbocki	-	-	-	-	1	2	10	3	-	-	-	-	-	-	-	-	-	-	-	-	6.9	0.8

Table 7. Gill-raker counts for species of *Chlidichthys* and *Pectinochromis*.

	Upper Gill-rakers											Lower Gill-rakers												
	3	4	5	6	7	8	9	10	11	$\bar{x}$	SD	9	10	11	12	13	14	15	16	17	18	19	20	$\bar{x}$	SD
C. abruptus	-	5	17	2	-	-	-	-	-	4.9	0.5	-	-	1	8	14	1	-	-	-	-	-	-	12.6	0.6
C. auratus	-	3	23	2	-	-	-	-	-	5.0	0.4	-	-	1	5	16	6	-	-	-	-	-	-	13.0	0.7
C. bibulus	-	7	5	-	-	-	-	-	-	4.4	0.5	-	1	2	9	-	-	-	-	-	-	-	-	11.7	0.7
C. cacatuoides	4	-	-	-	-	-	-	-	-	3.0	0.0	2	2	-	-	-	-	-	-	-	-	-	-	9.5	0.6
C. chagosensis	20	6	-	-	-	-	-	-	-	3.2	0.4	1	12	13	-	-	-	-	-	-	-	-	-	10.5	0.6
C. clibanarius	-	12	25	3	-	-	-	-	-	4.8	0.6	-	1	15	22	2	-	-	-	-	-	-	-	11.6	0.6
C. foudioides	-	23	5	1	-	-	-	-	-	4.2	0.5	-	-	-	26	3	-	-	-	-	-	-	-	12.1	0.3
C. inornatus	12	14	-	-	-	-	-	-	-	3.5	0.5	-	2	17	7	-	-	-	-	-	-	-	-	11.2	0.6
C. johnvoelckeri	-	11	16	1	-	-	-	-	-	4.6	0.6	-	-	1	23	4	-	-	-	-	-	-	-	12.1	0.4
C. pembae	40	-	-	-	-	-	-	-	-	3.0	0.0	3	22	14	1	-	-	-	-	-	-	-	-	10.3	0.7
C. randalli	-	2	-	-	-	-	-	-	-	4.0	0.0	-	-	-	-	2	-	-	-	-	-	-	-	13.0	0.0
C. rubiceps	10	19	3	1	-	-	-	-	-	3.8	0.7	-	-	11	17	5	-	-	-	-	-	-	-	11.8	0.7
C. smithae	15	2	-	-	-	-	-	-	-	3.1	0.3	-	7	10	-	-	-	-	-	-	-	-	-	10.6	0.5
P. lubbocki	-	-	-	-	-	-	7	5	2	9.6	0.7	-	-	-	-	-	-	-	-	-	3	10	1	18.9	0.5

	Total Gill-rakers																						
	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	$\bar{x}$	SD
C. abruptus	-	-	-	-	3	7	13	1	-	-	-	-	-	-	-	-	-	-	-	-	17.5	0.8
C. auratus	-	-	-	1	1	4	17	3	2	-	-	-	-	-	-	-	-	-	-	-	17.9	1.0
C. bibulus	-	-	1	1	6	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16.1	0.9
C. cacatuoides	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12.5	0.6
C. chagosensis	1	10	11	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13.7	0.8
C. clibanarius	-	-	-	7	15	14	3	1	-	-	-	-	-	-	-	-	-	-	-	-	16.4	1.0
C. foudioides	-	-	-	-	20	8	1	-	-	-	-	-	-	-	-	-	-	-	-	-	16.3	0.6
C. inornatus	-	1	10	10	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.7	0.8
C. johnvoelckeri	-	-	-	-	11	14	2	1	-	-	-	-	-	-	-	-	-	-	-	-	16.8	0.8
C. pembae	3	22	14	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13.3	0.7
C. randalli	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	17.0	0.0
C. rubiceps	-	-	7	6	12	6	-	1	-	-	-	-	-	-	-	-	-	-	-	-	15.7	1.2
C. smithae	-	7	8	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13.7	0.7
P. lubbocki	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11	1	1	1	28.4	0.9

Table 8. Pseudobranch filament counts for species of *Chlidichthys* and *Pectinochromis*.

	5	6	7	8	9	10	11	12	$\bar{x}$	SD
C. abruptus	-	-	9	9	4	2	-	-	8.0	1.0
C. auratus	-	1	5	19	2	-	-	-	7.8	0.6
C. bibulus	-	1	5	5	-	-	-	-	7.4	0.7
C. cacatuoides	-	-	1	1	2	-	-	-	8.3	1.0
C. chagosensis	1	4	19	2	-	-	-	-	6.8	0.6
C. clibanarius	-	-	13	22	3	2	-	-	7.9	0.8
C. foudioides	-	-	21	8	-	-	-	-	7.3	0.5
C. inornatus	-	-	19	6	1	-	-	-	7.3	0.5
C. johnvoelckeri	-	-	13	13	1	-	-	1	7.7	1.0
C. pembae	2	9	29	-	-	-	-	-	6.7	0.6
C. randalli	-	-	1	1	-	-	-	-	7.5	0.7
C. rubiceps	1	3	21	9	-	-	-	-	7.1	0.7
C. smithae	2	3	6	5	-	-	-	-	6.9	1.0
P. lubbocki	-	-	-	5	4	-	-	-	8.4	0.5

Table 9. Numbers of cephalic laterosensory pores in species of *Chlidichthys* and *Pectinochromis*. Bilateral counts are included for all but posterior interorbital pores (which are unpaired); a single pair of posttemporal pores was consistently observed in all specimens, and frequencies for this pore are therefore not given. AT, anterior temporal pores; PIO, posterior interorbital pores; POT, posterior otic pores; other abbreviations follow Figure 1.

	NAS				AIO				PIO				SOT				SUB					POT			
	2	3	$\bar{X}$	SD	1	2	$\bar{X}$	SD	0	1	$\bar{X}$	SD	1	2	$\bar{X}$	SD	6	7	8	$\bar{X}$	SD	0	1	$\bar{X}$	SD
C. abruptus	48	2	2.0	0.2	48	-	1.0	0.0	23	1	0.0	0.2	-	48	2.0	0.0	-	48	-	7.0	0.0	48	-	0.0	0.0
C. auratus	55	1	2.0	0.1	56	-	1.0	0.0	28	-	0.0	0.0	1	55	2.0	0.1	-	53	3	7.1	0.2	55	1	0.0	0.1
C. bibulus	24	-	2.0	0.0	24	-	1.0	0.0	10	2	0.2	0.4	-	24	2.0	0.0	-	23	-	7.0	0.0	24	-	0.0	0.0
C. cacatuoides	8	-	2.0	0.0	8	-	1.0	0.0	4	-	0.0	0.0	-	8	2.0	0.0	8	-	-	6.0	0.0	8	-	0.0	0.0
C. chagosensis	52	-	2.0	0.0	51	1	1.0	0.1	26	-	0.0	0.0	-	52	2.0	0.0	8	44	2	6.9	0.4	52	-	0.0	0.0
C. clibanarius	80	-	2.0	0.0	80	-	1.0	0.0	40	-	0.0	0.0	-	80	2.0	0.0	-	76	4	7.1	0.2	80	-	0.0	0.0
C. foudioides	57	1	2.0	0.1	58	-	1.0	0.0	28	1	0.0	0.2	-	58	2.0	0.0	-	58	-	7.0	0.0	58	-	0.0	0.0
C. inornatus	52	-	2.0	0.0	52	-	1.0	0.0	26	-	0.0	0.0	-	52	2.0	0.0	48	4	-	6.1	0.3	52	-	0.0	0.0
C. johnvoelckeri	53	1	2.0	0.1	54	-	1.0	0.0	27	-	0.0	0.0	-	54	2.0	0.0	4	50	-	6.9	0.3	54	-	0.0	0.0
C. pambae	80	-	2.0	0.0	60	-	1.0	0.0	40	-	0.0	0.0	-	80	2.0	0.0	-	80	-	7.0	0.0	80	-	0.0	0.0
C. randalli	4	-	2.0	0.0	4	-	1.0	0.0	2	-	0.0	0.0	-	4	2.0	0.0	-	4	-	7.0	0.0	4	-	0.0	0.0
C. rubiceps	68	-	2.0	0.0	68	-	1.0	0.0	33	1	0.0	0.2	-	68	2.0	0.0	63	5	-	6.1	0.3	68	-	0.0	0.0
C. smithae	34	-	2.0	0.0	34	-	1.0	0.0	17	-	0.0	0.0	-	34	2.0	0.0	-	33	1	7.0	0.2	34	-	0.0	0.0
P. lubbocki	16	-	2.0	0.0	16	-	1.0	0.0	8	-	0.0	0.0	-	16	2.0	0.0	-	16	-	7.0	0.0	16	-	0.0	0.0

	POP					DEN					IT				AT				PAR			
	5	6	7	$\bar{X}$	SD	3	4	5	$\bar{X}$	SD	0	1	$\bar{X}$	SD	0	1	$\bar{X}$	SD	2	3	$\bar{X}$	SD
C. abruptus	1	46	1	6.0	0.2	-	47	1	4.0	0.1	-	48	1.0	0.0	46	2	0.0	0.2	48	-	2.0	0.0
C. auratus	-	55	1	6.0	0.1	-	56	-	4.0	0.0	-	56	1.0	0.0	55	1	0.0	0.1	54	2	2.0	0.2
C. bibulus	-	22	-	6.0	0.0	1	21	-	4.0	0.2	1	23	1.0	0.2	22	2	0.1	0.3	23	-	2.0	0.0
C. cacatuoides	-	8	-	6.0	0.0	-	8	-	4.0	0.0	-	8	1.0	0.0	8	-	0.0	0.0	8	-	2.0	0.0
C. chagosensis	-	52	-	6.0	0.0	-	52	-	4.0	0.0	-	52	1.0	0.0	52	-	0.0	0.0	52	-	2.0	0.0
C. clibanarius	-	79	1	6.0	0.1	1	79	-	4.0	0.1	1	79	1.0	0.1	80	-	0.0	0.0	80	-	2.0	0.0
C. foudioides	-	55	3	6.1	0.2	-	58	-	4.0	0.0	-	58	1.0	0.0	56	2	0.0	0.2	58	-	2.0	0.0
C. inornatus	-	49	2	6.0	0.2	-	52	-	4.0	0.0	-	52	1.0	0.0	52	-	0.0	0.0	52	-	2.0	0.0
C. johnvoelckeri	-	54	-	6.0	0.0	-	54	-	4.0	0.0	-	54	1.0	0.0	54	-	0.0	0.0	54	-	0.0	0.0
C. pambae	-	80	-	6.0	0.0	1	79	-	4.0	0.1	1	79	1.0	0.1	80	-	0.0	0.0	79	1	2.0	0.1
C. randalli	-	4	-	6.0	0.0	-	4	-	4.0	0.0	-	4	1.0	0.0	4	-	0.0	0.0	4	-	2.0	0.0
C. rubiceps	-	67	1	6.0	0.1	1	65	2	4.0	0.2	-	68	1.0	0.0	68	-	0.0	0.0	68	-	2.0	0.0
C. smithae	-	34	-	6.0	0.0	1	33	-	4.0	0.2	-	34	1.0	0.0	34	-	0.0	0.0	34	-	2.0	0.0
P. lubbocki	-	16	-	6.0	0.0	-	18	-	4.0	0.0	-	16	1.0	0.0	16	-	0.0	0.0	15	1	2.1	0.3

Table 10. Frequencies of anterior dorsal-fin pterygiophore formulae (for preneural and first three interneural spaces only) in species of *Chlidichthys* and *Pectinochromis*. Code: A, S/S/3/1 + 1; B, S/S/3/1; C, S/S/S + 3/1 + 1; D, S/S/3 + 1/1 + 1; E, S/S/3 + 1/1; F, S//3 + 1/1; G, //3 + 1/1.

	A	B	C	D	E	F	G
C. abruptus	4	-	9	-	-	-	-
C. auratus	22	-	1	-	-	-	-
C. bibulus	11	-	2	-	-	-	-
C. cacatuoides	4	-	-	-	-	-	-
C. chagosensis	28	-	-	-	-	-	-
C. clibanarius	18	1	-	-	-	-	-
C. foudioides	21	-	7	-	-	-	-
C. inornatus	21	-	-	-	-	-	-
C. johnvoelcker	28	-	-	-	-	-	-
C. pembae	38	1	-	-	1	-	-
C. randalli	2	-	-	-	-	-	-
C. rubiceps	28	-	-	1	-	-	-
C. smithae	17	-	-	-	-	-	-
P. lubbocki	-	-	-	-	1	7	6

Table 11. Numbers of consecutive dorsal pterygiophores inserting in 1:1 relationship behind neural spine 4 in species of *Chlidichthys* and *Pectinochromis*. Counts for rare specimens in which there were departures from three pterygiophores inserting in front of neural spine 4 were accordingly adjusted so as to portray the position of the first 2:1 relationship near the posterior part of the dorsal fin.

	14	15	16	17	$\bar{x}$	SD
C. abruptus	-	13	1	-	15.1	0.3
C. auratus	-	23	-	-	15.0	0.0
C. bibulus	-	10	3	-	15.2	0.4
C. cacatuoides	-	1	2	1	16.0	0.8
C. chagosensis	1	26	1	-	15.0	0.3
C. clibanarius	1	17	1	-	15.0	0.3
C. foudioides	-	25	4	-	15.1	0.4
C. inornatus	-	20	1	-	15.0	0.2
C. johnvoelckeri	1	22	5	-	15.1	0.4
C. pembae	-	39	1	-	15.0	0.2
C. randalli	-	2	-	-	15.0	0.0
C. rubiceps	-	2	27	-	15.9	0.3
C. smithae	-	14	3	-	15.2	0.4
P. lubbocki	-	14	-	-	15.0	0.0

Table 12. Frequencies of anterior anal-fin pterygiophore formulae (for prehaemal and first interneural spaces only) in species of *Chlidichthys* and *Pectinochromis*. Code: A, 3/1 + 1; B, 3/1; C, 3 + 1/1; D, 3/1 + 1 + 1; E, /3 + 1 + 1; F, 2/1 + 1; G, 2/1; H, /2 + 1 + 1; I, 2 + 1/1; J, /2 + 1.

	A	B	C	D	E	F	G	H	I	J
C. abruptus	12	-	-	-	-	1	1	-	-	-
C. auratus	14	1	6	1	-	-	-	-	-	-
C. bibulus	9	3	-	-	1	-	-	-	-	-
C. cacatuoides	3	-	-	-	1	-	-	-	-	-
C. chagosensis	28	-	-	-	-	-	-	-	-	-
C. clibanarius	18	-	-	-	1	-	-	-	-	-
C. foudioides	22	-	-	-	6	-	-	-	-	1
C. inornatus	20	-	-	-	-	1	-	-	-	-
C. johnvoelckeri	26	-	-	-	1	1	-	-	-	-
C. pembae	3	-	-	-	-	34	-	1	1	-
C. randalli	2	-	-	-	-	-	-	-	-	-
C. rubiceps	29	-	-	-	-	-	-	-	-	-
C. smithae	12	-	-	-	1	3	-	1	-	-
P. lubbocki	-	-	-	-	-	13	1	-	-	-

Table 13. Numbers of consecutive anal pterygiophores inserting in 1:1 relationship behind haemal spine 2 in species of *Chlidichthys* and *Pectinochromis*. Counts for rare specimens in which there were departures from three pterygiophores inserting in front of haemal spine 2 were accordingly adjusted so as to portray the position of the first 2:1 relationship near the posterior part of the anal fin.

	4	5	6	7	8	$\bar{x}$	SD
C. abruptus	-	-	3	11	-	6.8	0.4
C. auratus	-	-	1	22	-	7.0	0.2
C. bibulus	-	-	3	10	-	6.8	0.4
C. cacatuoides	-	-	-	-	4	8.0	0.0
C. chagosensis	-	-	2	26	-	6.9	0.3
C. clibanarius	-	-	8	11	-	6.6	0.5
C. foudioides	-	-	3	25	1	6.9	0.4
C. inornatus	-	-	6	15	-	6.7	0.5
C. johnvoelckeri	-	-	11	17	-	6.6	0.5
C. pembae	1	-	6	32	-	6.8	0.6
C. randalli	-	-	-	2	-	7.0	0.0
C. rubiceps	-	-	-	10	19	7.7	0.5
C. smithae	-	-	2	15	-	6.9	0.3
P. lubbocki	-	-	2	12	-	6.9	0.4

Table 14. Caudal vertebral counts for species of *Chlidichthys* and *Pectinochromis* (all specimens had 10 precaudal vertebrae).

	16	17	18	19	$\bar{X}$	SD
C. abruptus	-	13	-	-	17.0	0.0
C. auratus	-	23	-	-	17.0	0.0
C. bibulus	-	13	-	-	17.0	0.0
C. cacatuoides	-	-	4	1	18.2	0.4
C. chagosensis	-	28	-	-	17.0	0.0
C. clibanarius	-	19	-	-	17.0	0.0
C. foudioides	-	28	1	-	17.0	0.2
C. inornatus	1	20	-	-	17.0	0.2
C. johnvoelckeri	-	28	-	-	17.0	0.0
C. pembae	-	40	-	-	17.0	0.0
C. randalli	-	2	-	-	17.0	0.0
C. rubiceps	-	-	29	-	18.0	0.0
C. smithae	-	16	1	-	17.1	0.2
P. lubbocki	1	13	-	-	16.9	0.3

Table 15. Numbers of epineural bones for species of *Chlidichthys* and *Pectinochromis*.

	13	14	15	16	17	18	$\bar{X}$	SD
C. abruptus	1	3	7	1	-	-	14.7	0.8
C. auratus	-	12	6	1	-	-	14.4	0.6
C. bibulus	1	3	6	3	1	-	15.0	1.0
C. cacatuoides	-	-	-	3	1	-	16.3	0.5
C. chagosensis	-	1	10	12	2	-	15.6	0.7
C. clibanarius	-	9	6	3	1	-	14.8	0.9
C. foudioides	-	6	16	4	-	-	14.9	0.6
C. inornatus	-	-	7	11	1	1	15.8	0.8
C. johnvoelckeri	-	1	14	5	-	-	15.2	0.5
C. pembae	-	3	16	15	1	-	15.4	0.7
C. randalli	1	1	-	-	-	-	13.5	0.7
C. rubiceps	-	1	10	8	5	2	15.9	1.0
C. smithae	-	-	4	8	2	2	16.1	1.0
P. lubbocki	-	8	3	-	-	-	14.3	0.5

A) *Chlidichthys abruptus*, St Brandon's Shoals (photo by O. Nordlinger)

B) *C. auratus*, NE of Hurghada, Egypt, Red Sea (photo by G.E. Barrall, © 2004 G.E. Barrall)

C) *C. auratus*, 73 km ESE of Mersa Alam, Egypt, Red Sea (photo by G.E. Barrall, © 2004 G.E. Barrall)

D) *C. bibulus*, BPBM 27310, 40.2 mm SL, Watamu Marine Reserve, Kenya (photo by J.E. Randall)

E) *C. cacatuoides*, SMF 29231, 30.5 mm SL, Darsa Id, Socotra (photo by U. Zajonz)

F) *C. chagosensis*, ROM 46322, 19.1 mm SL, paratype, Isle Du Coin, Peros Banhos Atoll, Chagos Archipelago (photo by R. Winterbottom).

Plate 1.

A) *Chlidichthys chagosensis*, ROM 72507, 23.7 mm SL, paratype, Isle Du Coin, Peros Banhos Atoll, Chagos Archipelago (photo by R. Winterbottom)

B) *C. clibanarius*, ROM 72494, 39.4 mm SL, Pomanji Id, Mayotte, Comoro Ids (photo by R. Winterbottom)

C) *C. foudioides*, RUSI 67432, 39.8 mm SL (paratype), Rodrigues (photo by P.C. Heemstra)

D) *C. foudioides*, RUSI 69151, 28.5 mm SL (paratype), Rodrigues (photo by P.C. Heemstra)

E) *C. inornatus*, BPBM 32973, 32.2 mm SL (upper specimen) and 30.6 mm SL (lower specimen), Embudu Id, South Malé Atoll, Maldive Ids (photo by J.E. Randall)

F*) C. johnvoelckeri*, ROM 72498, 36.0 mm SL, Anjouan, Comoro Ids (photo by R. Winterbottom).

Plate 2.

A) *Chlidichthys pembae*, Comoro Ids (photo by R. Winterbottom)

B) *C. pembae*, Comoro Ids (photo by R. Winterbottom)

C) *C. randalli*, BPBM 16299, 33.8 mm SL, holotype, Flamand Islet, Mauritius (photo by J.E. Randall)

D) *C. rubiceps*, island 95 km SE of Mersa Alam, Egypt, Red Sea (photo by G.E. Barrall, © 2004 G.E Barrall)

E) *C. smithae*, BMNH 1975.2.12.26, 33.2 mm SL, paratype, Flamand Islet, Mauritius (photo by J.E. Randall)

F) *Pectinochromis lubbocki*, BPBM 28114, 34.2 mm SL, holotype, Sinai Peninsula, Gulf of Aqaba, Red Sea (photo by J.E. Randall).

Plate 3.